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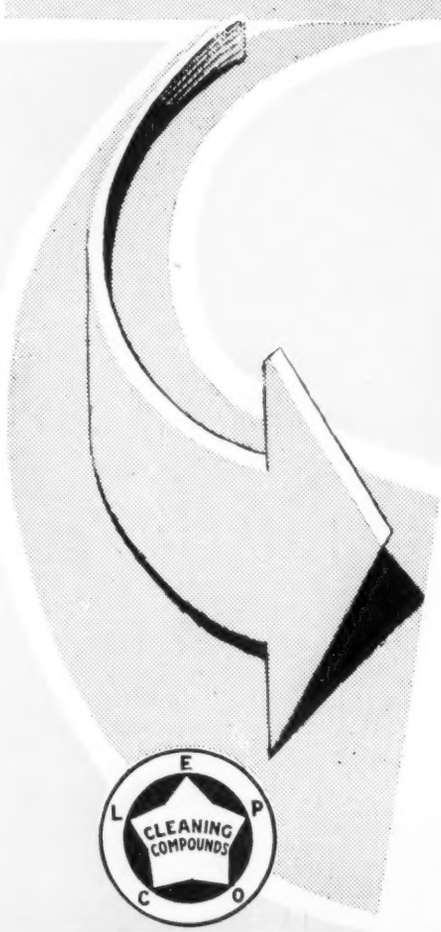

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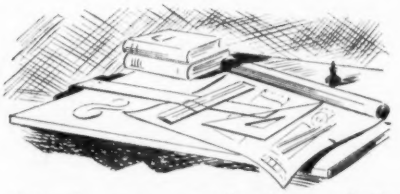

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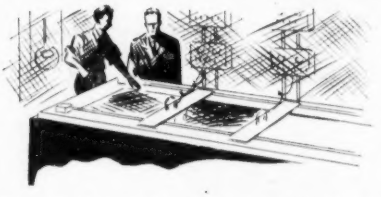

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VOL. 44, NO. 2

METAL FINISHING

FEBRUARY, 1946

PREPARATION, ELECTROPLATING, COATING

NICKEL—Bright or Dull?

With all efforts turned to civilian production, nickel is again established in its leading position among the coating metals employed for the dual purpose of protection and decoration. Most often with a superimposed deposit of chromium to preserve a bright appearance, and sometimes without it, it will confront us on all sides, on innumerable articles of manufacture of every description.

Years ago, during their introductory period, hot bright nickel processes were generally rejected by many platers for two reasons. One was the necessity for replacing the asphalt-lined wood tank and room temperature solution with rubber-lined tank, Watts type solution, heating and filtering equipment. The other was the fear of inconsistent results due to lack of experience in the handling of solutions with relatively unknown operating characteristics at that time.

While very thin deposits were acceptable, cold nickel solutions, with cadmium or gum added as a brightener if desired, were quite suitable. Now, with anticipated demand for heavy deposits, hot, fast plating solutions are a must. Because of the scarcity of polishers and in view of the insignificant cost differential between the dull and bright hot nickel installation, many firms engaged in nickel plating are reconsidering the advisability of installing bright nickel. So that such firms may not be disappointed because bright nickel might not come up to their expectations, a few remarks are in order.

Bright nickel plating is no more troublesome than dull nickel if suitable precautions are taken to insure proper preparation of the work and avoidance of solution contamination, but sloppy operation will mean trouble in big doses. The process should not be installed with the expectation of completely eliminating all nickel-buffing, since this would require absolutely perfect operation of the solution at all times and a color-buffed base without fingerprints, wheel marks or cloudy streaks. On articles which are to be finished without any buffing before or after plating, such as cheap kitchen utensils and tools, the superior appearance of bright nickel, as compared with dull deposits, will be an important sales advantage.

Some may question the superiority of bright nickel, considering that more careful color-buffing and handling, one-hundred per-cent inspection before chromium plating and the probability of having to nickel-buff up to twenty per-cent of the parts anyhow because of imperfections may be just as expensive as nickel-buffing everything. The answer to that question has been found in the experience of many finishers who installed bright nickel with the intention of nickel-buffing all parts, the increase in output due to the ease of buffing bright nickel and the possibility of disregarding recesses, which are always expensive to buff, being more than sufficient to justify the decision.

PRACTICAL CONDUCTIVITY MEASUREMENTS

By J. B. MOHLER and JEAN STERNISHA

Research Chemists, The Cleveland Graphite Bronze Co., Cleveland, O.

Introduction

RAPID methods of analysis are desirable in plating applications due to the constant change taking place in solutions that are used. Methods that can be used at the plating line are best for immediate checks and proper additions.

A rapid measuring instrument that falls in this class, but is not widely used for solution control is the conductivity meter.

Several examples are given here to illustrate the use and application of such an instrument.

As a Control Factor

The resistance offered to the flow of current through an electrolyte depends upon the ionic concentration and the size and spacing of the electrodes.

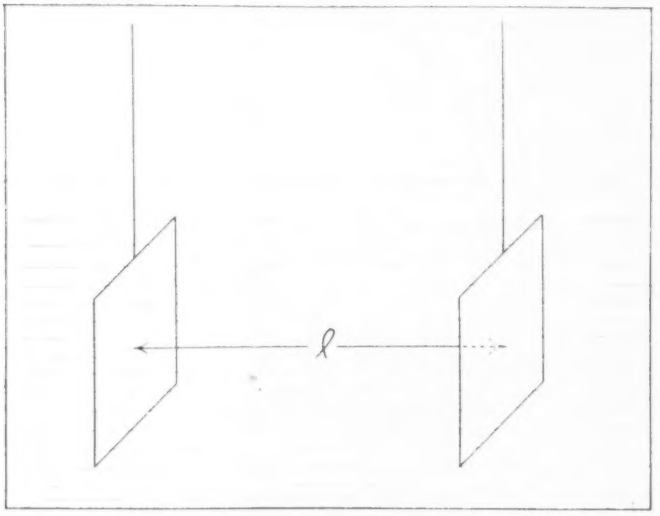


Fig. 1

The specific resistance or resistivity is defined as the resistance of a volume of solution one centimeter long and one square centimeter in cross section.

1. $$R = r \frac{l}{a}$$

R = resistance in ohms
r = resistivity
l = length of conductor
a = a cross sectional area

The resistance will increase upon:

(a) Dilution of the electrolyte
(b) Decrease in the size of the electrodes
(c) Increase in the distance between the electrodes

Water, due to the low concentration of the ions it forms, is such a very poor conductor that the addition of a small amount of salt will increase the conductance many times, so that in most practical measurements, the current carried by the ionized portion of the water is negligible.

On measuring the resistance of sodium chloride solutions with a cell of fixed dimensions, the following results were obtained:

TABLE NO. 1

NaCl	Resistance In Ohms		
p.p.m.	15° C.	20° C.	30° C.
50	8580	8000	6400
200	2200	1970	1660
400	1190	1020	850
500	920	830	690

In these, almost completely ionized dilute solutions, it is seen the resistance of the solution decreases to about one-tenth tenfold increase in concentration.

From the behavior of highly ionized substances on dilution, apparent that the relationship between concentration and resi may be represented by a simple formula:

2. $$R C = K$$

R = resistance
C = concentration
K = a constant

TABLE NO. 2

	$R C \times 10^5$		
C	15° C.	20° C.	30° C
50	4.30	4.00	3.20
200	4.40	3.94	3.32
400	4.76	4.08	3.40
500	4.65	4.15	3.45
Av.	4.53	4.04	3.34

Over the range 50 to 500 parts per million of sodium chl K increases only slightly. This deviation of K will be greate more concentrated solutions but, in practical baths, such as an line cleaner, the chemical limits are usually not greater than a tw increase in concentration so that it will be found that this equ will readily apply.

The equation is of advantage because the resistivity need on measured at one concentration to establish an operating curve, viding the temperature correction be taken into account.

The resistance decreases approximately 2 percent for each de Centigrade, which is a change of enough magnitude for ordi temperature differentials encountered that it must either be measu or taken care of by the following formula:

3. $$R_m = R_t [1 + x (t - m)]$$

R_m = resistance at temperature m
R_t = resistance at temperature t
x = a constant (the temperature coefficient of the electrol
x = .017 for acids
= .019 for bases
= .022 to .025 for salts[1]

Using .023 as x for sodium chloride and the data at 30° C. 50 parts per million as a basis, the following results were calcula

TABLE NO. 3

	15° C.	20°
Measured R	8580	80
Calculated R	8620	83

An example of the calculation for 20° C. is given below:

$$R_m = R_t [1 + x (t - m)]$$
$$6400 = R_t [1 + .023 (20 - 30)]$$
$$R_t = 8310$$

This equation is good for temperatures ranging from room temp ture to the boiling point, but since actual measurements are relati simple, it is recommended that this be done for each new applica

The resistance data of Table No. 1 were taken with a dip conductivity cell and an inexpensive conductivity meter employi cathode ray tube to indicate electrical balance (see photographs)

The dip cell is easy to use and may even be installed direct the tank if desired.

Some of these meters have a temperature compensator, makin unnecessary to calculate or measure the temperature effect, bu must be realized that the temperature compensator was installed use with a particular type of solution so that if maximum accu

is desired, it will not apply to all solutions unless a special meter is used in each case.

Controlling Cleaners

The practical application of such an instrument may be illustrated through its use in controlling an alkaline cleaner.

It has been found that, if the conductivity of a cleaner is held within limits that will give good cleaning power for a fresh cleaner, either by addition of cleaner or of the most essential chemical, the cleaner may be so controlled for a one week period, which is an economic period of time for most cleaner applications. Where the continuous operation of a cleaner is desired, this method of control is not recommended, for the build-up of carbonate will eventually interfere with the established conductivity limits.

For most cleaner applications operated at line voltage, the cleaning power is largely dependent on high current density brought about by increased conductivity due to elevated temperatures. However, for a given temperature, since cleaning power depends greatly on the concentration and thus on the conductivity, it is obvious that conductivity is an important cleaning factor worthy of direct measurement.

In a heavy duty commercial cleaner such as one of the high pH silicated types, it is often permissible to maintain the original conductivity limits by the addition of caustic rather than cleaner. If drag-out is not too great, satisfactory cleaning may be maintained in this way for periods up to one week.

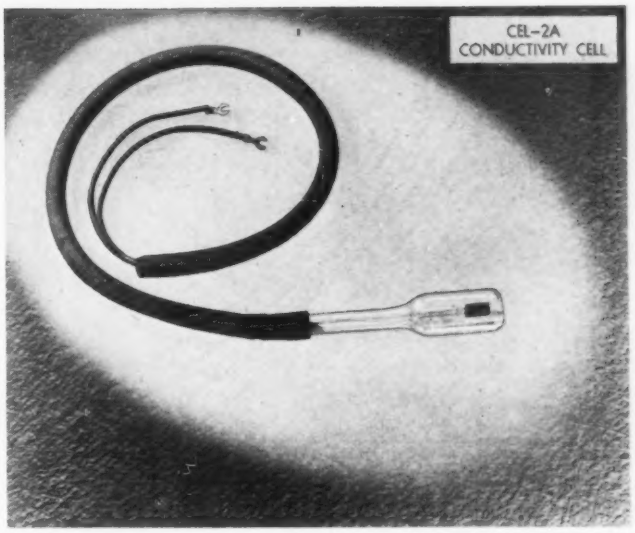
Continuous control at the cleaning line is possible by the use of a dip cell, a conductivity meter and an operating graph showing the concentration expressed as cleaner or, better yet, as the total pounds of cleaner for a specific size tank.

When a new dip cell is to be used, the approximate reading that will be obtained for a certain salt may be calculated from the cell constant supplied by the manufacturer.[2] It is much more satisfactory, however, to make a few preliminary readings with solutions for which the cell is to be used.

It is unnecessary to take the most accurate and exacting measurements for the broad limits permissible in a cleaner application so that both the concentration and temperature effect may be determined in an hour. Usually it will be found that best results are obtained

(Courtesy Industrial Instruments, Inc.)

Conductivity Bridge.



(Courtesy Industrial Instruments, Inc.)

Conductivity Cell.

on diluted samples and this is best determined by trying 1/2, 1/5, and 1/10 the original concentration.

If a cell is used for a new application, it is well to measure and record the variation of R with concentration and to determine the temperature coefficient X of equation 3. It will then be possible to construct a graph for any other cell by merely checking one point and calculating the concentration and temperature effects from the original data.

In graphing the data, a simple chart or an alignment chart may be used to show the temperature—concentration—resistance relationships (see Charts I and II).

An alignment chart may be constructed from equation 2 which is an easy form from which to make such a chart.[3]

The equipment described has been successfully used for both silicated and phosphated cleaners, as well as for pickle solutions. For the latter, a preliminary gravity reading, and subsequent correction may be necessary if the acid concentration is low and that of the iron high. However, in most common applications, this is not true and the concentration of the iron has little effect since the conductivity of acid solutions depends principally on the concentration of the hydrogen ion.

For acid solutions platinum electrodes must be used, which are available in glass dip cells, while satisfactory cells for alkaline or neutral solutions are available in rubber, with nickel electrodes. The latter cell is cheaper and less fragile, and so is more desirable where it can be applied.

In any case it is necessary to platinize the electrodes occasionally in order to obtain sharp tuning. This is readily done by plating alternately on each electrode, from a platinic chloride solution, until they are covered with platinum black. Details of this operation may be obtained from the manufacturer or for a fee the cells may occasionally be returned for replatinization.

Behavior of Rinse Waters

A particular problem in plating, presented by rinse tanks, is readily studied by use of conductivity equipment.

It has already been shown that small amounts of salt in water (Table I) can readily be measured with this equipment. The method is of sufficient sensitivity that the increase of concentration in a fair sized tank due to the drag-in from a single rack can readily be detected.

Calculation of the behavior of a running rinse tank may be made on the basis that the maximum concentration of the incoming salt will be reached when:

4. drag-in = drag-out.[4]

Such a calculation can be made from fairly simple equations, assuming regular additions of incoming salt to the rinse tank and a steady flow of water through the tank. In actual practice these conditions are well approximated by racks introduced at more or less regular intervals.

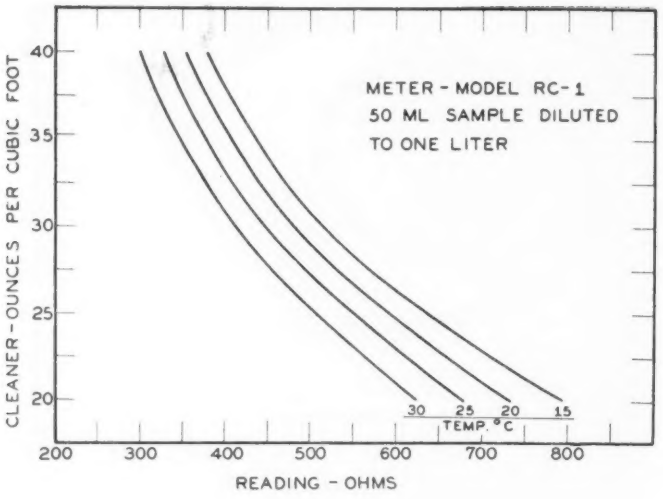


Chart 1

The rate of removal of a salt from a rinse tank may be calculated from the equation:

$$5. \qquad \log C_t = \log C_o - \frac{\text{Flow} \times \text{Time}}{2.3}.$$

C_t = concentration at time t
C_o = concentration at zero time
Flow = decimal fraction of the total removed in one unit of time.

The development of the mathematical method is best demonstrated by assuming several problems.

PROBLEM NO. ONE:

A 500 liter tank has a flow of 50 liter per minute and an initial concentration of 100 p.p.m. NaCl. What will the concentration be at the end of 5 minutes?

$$\text{Flow} = \frac{50}{500} = .10$$

$$\text{Log } C = \text{Log } 100 - \frac{.10 \times 5}{2.3}$$

$$= 1.783$$

$$C = 61 \text{ p.p.m.}$$

There are two simplifications that will make this equation easy to use: first, the flow expressed as a decimal fraction of the total rather than as an absolute unit; second, the concentration set arbitrarily at 100. Then if the actual concentration at zero time were 87, the concentration after 5 minutes would be:

$$\frac{61}{100} \times 87 = 53 \text{ p.p.m.}$$

PROBLEM NO. TWO:

A ten liter tank has a flow of one liter per minute. Each minute 100 p.p.m. are added to the tank. How will the concentration increase? What will be the maximum concentration? In what time will 90% of the maximum concentration be reached?

At zero time 100 p p.m. are added. At the end of one minute the concentration will be:

$$\text{Log } C_t = 2 - \frac{.10 \times 1}{2.3}$$

$$C_t = 90.3$$

This means that at the end of each minute 90.3 percent of the concentration existing one minute previously will remain.

At the end of one minute, the concentration will be:

$$100 \times .903 = 90.3 \text{ p.p.m.}$$

At the same time, the next addition of salt will be added just as salt is periodically added due to the rinsing of a plating rack. The concentration will then be:

$$100 + 90.3 = 190.3 \text{ p.p.m.}$$

At the end of two minutes the concentration will be:

$$190.3 \times 90.3 = 171 \text{ p.p.m.}$$

TABLE NO. 4

Time	*Conc.*	*Conc. + 100 p.p.m.*	*(Conc. + 100 p.p.m.) × .903*	*Incr*
0	0	100	90.3	
1	90.3	190.3	171	
2	171	271	245	
3	245	345	311	
4	311	411	371	
5	371	471	425	
6	425	525	474	
7	474	574	518	
8	518	618	558	
9	558	658	594	
10	594	694	626	
11	626	726	655	
12	655	755	681	
13	681	781	705	
14	705	805	726	
15	726	826	746	
16	746	846	763	
17	763	863	778	
18	778	878	792	
19	792	892	804	
20	804	904	815	
40	904	1004	905	
Equilib.	1031	1131	1031	

By this incremental method of calculation, the behavior of rinse tank of Problem No. Two can be tabulated as in Table No.

The average increase in the first 20 minutes is 41 p.p.m. varies from 90 p.p.m. the first minute to 11 p.p.m. On this the average increase for 20 to 40 minutes will be:

$$11 \times \frac{41}{90} = 5.$$

The total increase will be:

$$20 \times 5 = 100 \text{ p.p.m.}$$

The increase at the end of 40 minutes will be at the rate of

$$11 \times \frac{11}{90} = 1.3 \text{ p.p.m.}$$

The concentration at the end of 40 minutes will be

$$804 + 100 = 904.$$

The accuracy of this method of approximating the rate of appr to equilibrium may be checked by applying equation 4.

When equilibrium is finally attained:

$$\text{drag-in} = \text{drag-out} = 100 \text{ p.p.m.}$$

If 90.3 percent remains of the total concentration plus the prev one minute addition then:

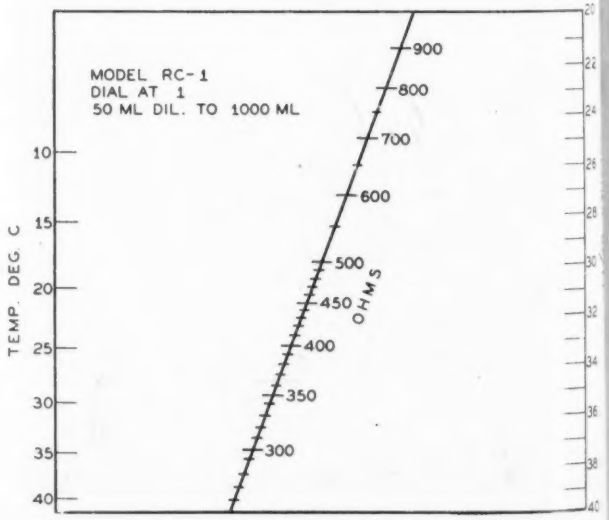
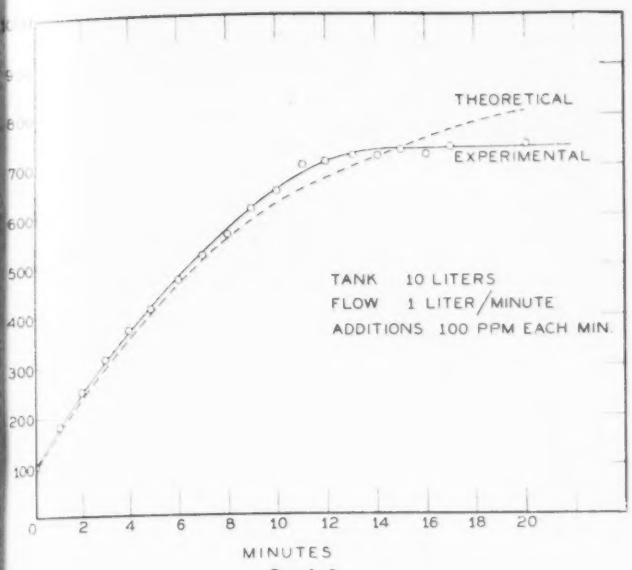


Chart 2



Graph 1

$$\text{drag-out} = 100 - 90.3 = 9.7\%$$

$$100\% = \frac{100 \text{ p.p.m.}}{.097} = 1031 \text{ p.p.m.}$$

This approximates the 1004 p.p.m. obtained after the 100 p.p.m. addition showing that for practical purposes equilibrium has been attained.

The condition for 40 minutes and for equilibrium are shown in Table 4.

If the initial concentration were 2000 p.p.m. and 100 p.p.m. were added each minute, the concentration would still level off at 1031 p.p.m. and the behavior could be calculated in a similar manner.

The incremental method is laborious, but inspection of the steps will reveal that the calculations can be thrown into a general form shown in equation 6.

6. $$C_N = L\,(1 - R^N)$$

C_N = concentration at period N
L = limiting concentration
R = decimal fraction of solution remaining after drag-out.

$$L = \frac{M}{D}$$

M = drag-in per period
D = drag-out as decimal fraction of the total per period
R = 1-D
N = number of periods.

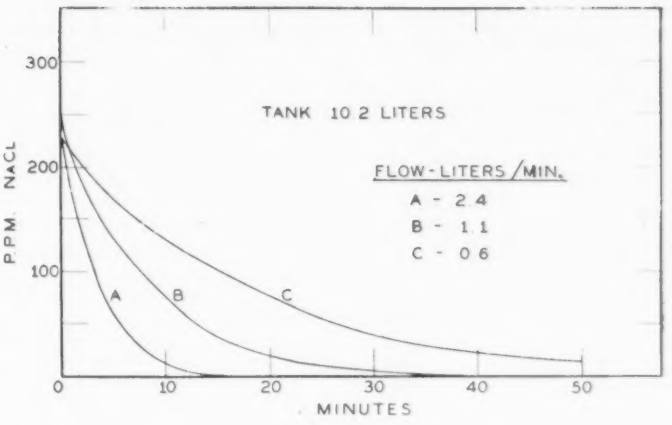
Calculations by equation 6 as applied to Problem No. Two are shown in Table 5.

TABLE NO. 5

N	*L (1—R^N)*	*From Table No. 4*
1	100	100
2	191	190
3	270	271
4	344	345
5	410	411
10	657	694
20	895	904
40	1012	1004

It is seen that L (1 — R^N) corresponds to (concentration + 100 p.p.m.) of Table 4 and is the maximum concentration just after an addition is made. N = 1 corresponds to zero time and the calculations differ slightly due to cumulative errors in the incremental method.

Since it is impractical to determine the time to reach the maximum concentration, an arbitrary value of 90% of the maximum gives a good idea of how long it takes to reach the approximate maximum.



Graph 2

For Problem No. Two, this is solved as follows:

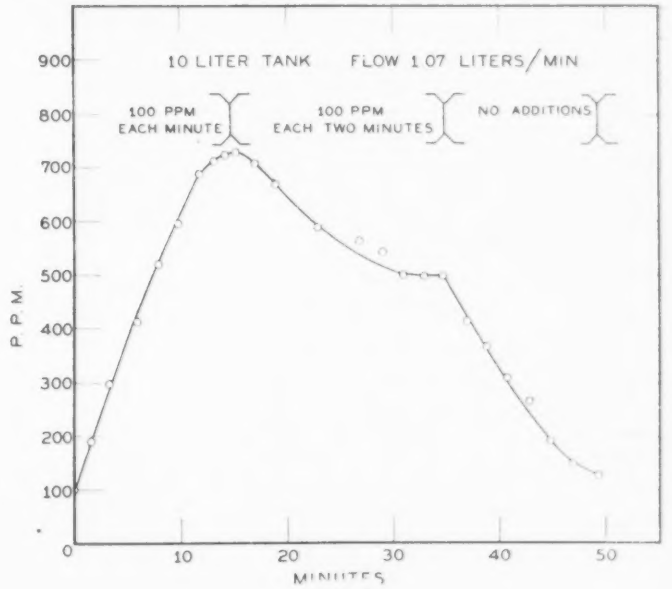
$$1031 \times .90 = 928$$
$$928 = 1031\,(1 - R^N)$$
$$1 - R^N = .90$$
$$R^N = .10$$
$$N = \frac{\log .10}{\log R}$$
$$= \frac{\log .106}{\log .903}$$
$$= \frac{-1.00}{-.044}$$
$$= 23 \text{ periods.}$$

An experimental run was made on a 10 liter tank having a flow of 1 liter per minute, and an addition of 100 p.p.m. at each one minute period.

The results are shown graphically compared to those of Problem No. Two (Graph No. 1). It is seen that the experimental curve follows the calculated closely for about 12 minutes. But the concentration apparently levels off at this time while in contrast the theoretical curve continues to rise.

Several experiments were run by putting the entering water and the additions in at various points. One experiment was tried where the rinse tank was mechanically agitated in addition to the mixing due to the flow of the water. All of these results gave approximately the same type curve.

Although the reason is not clear, the results indicate that the salt additions are carried away before they have a chance to mix with the solution present. Equilibrium was reached in 12 minutes



Graph 3

at about 750 p p.m. compared to 23 minutes for 928 p.p.m. and 1031 p.p.m., which is the calculated equilibrium. Since flow rates are not closely controlled in rinse tanks, this is a reasonable approximation of rinse tank behavior.

The effect of flow on the rate of change of concentration may be seen for experimental results in Graph No. 2. An initial concentration of about 225 p.p.m. was used in each case and the tank was allowed to flow at a steady rate. The dip cell was allowed to remain in the tank and readings were taken each minute.

The following table shows the results for a flow of 1.1 liters per minute and an initial concentration of 235 p.p.m., where the calculated result from equation 5 is compared to the experimental.

TABLE NO. 6

Percent Salt Remaining	*Calculated Minutes*	*Calculated p.p.m.*	*Graph p.p.m.*
100	235.0	235	235
90	1.0	212	210
80	2.1	188	205
70	3.3	165	155
60	4.7	141	116
50	6.4	118	105
40	8.4	95	85
30	11.0	71	65
20	14.8	47	37
10	21.1	24	17

It is seen that the agreement is good for equation 5.

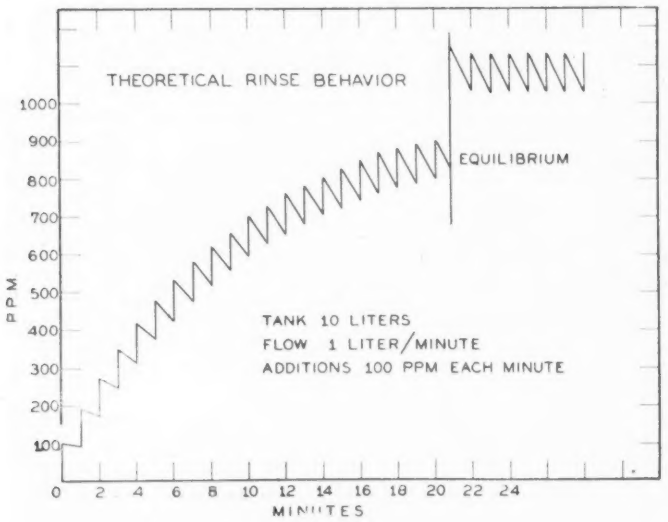
For practical purposes the rinse tank under experimental conditions reaches an equilibrium corresponding to a theoretical tank with about a 30 per cent faster flow. This error in flow is not great when it is seen from Graph No. 2 how the change in flow rate affects the rate of removal of the salt.

Graph No. 3 is an experimental run to show how readily a tank responds to a change in conditions. Additions of 100 p.p.m. were made every minute for 15 minutes. From 15 to 35 minutes, addition of 100 p.p.m. were made every two minutes and at 35 minutes additions were discontinued. For the longer time between additions, the tank appears to approach an equilibrium more closely approximating the theoretical.

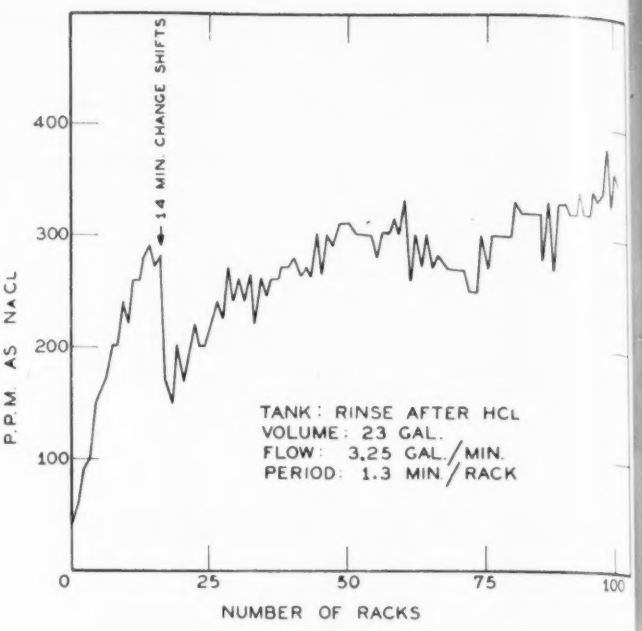
If the calculations of Table 4 are plotted, they will appear as in Graph No. 4. The graph readily shows the additions that may be seen even in practice if the flow through the tank is slow.

Graph No. 5 shows a plot of conductivity measurements under actual plating line conditions where racks are put through the tanks at approximately regular intervals. It is seen that the concentration rises rapidly and the approximate drag-in can be estimated.

The data on the tank is as follows:
TANK: Rinse after the HCl tank
VOLUME: 23 Gallons
FLOW: 3¼ gallons per minute
RACK AREA: 1.2 square feet



Graph 4



Graph 5

PERIOD: 1.3 minutes per rack.
FLOW PER PERIOD:

$$\frac{1.3 \times 3.25 \times 100}{23} = 18.4\% \text{ of total volume}$$

SALT REMOVED PER PERIOD:

$$C_t = C_o - \frac{\text{Flow} \times \text{Time}}{2.3}$$

(Time = one period)

$$= 100 - \frac{.184 \times 1}{2.3}$$

$$= 83.1$$

Salt Removed = 100 — 83.1
= 16.9% per period

From the rapid rise in the curve for early additions, the drag-in is estimated at 50 p.p.m. The approximate limit will then be

$$L = \frac{50}{.17} = 300 \text{ p.p.m.}$$

Time to reach 90% of the maximum concentration is:

$$N = \frac{\log .10}{\log R} = \frac{-1.00}{\log .831} = \frac{-1.00}{-.08}$$

= 12.5 periods

12.5 periods × 1.3 minutes per period = 16 minutes.

These estimations agree quite well with the graphical results. The readings were made with a meter calibrated for p.p.m. NaCl as a convenient general standard. Conversion to actual HCl is shown at the right of the graph.

In order to compare the measured concentration against the calculated in rinse tanks after various operations, the following data were obtained under production conditions in manually operated tanks.

Rinse Tank for	*% Flow*	*Max. Conc. g/l. Calc.*	*Maximum Measured*	*% Error*
Cleaner	2	.075 NaOH	.070	— 6
Pickle	8.5	.036 HCl	.019	—50
Nickel	8.2	.049 Ni	.071	+45
Cleaner	2.6	.065 NaOH	.08	+25
Pickle	2.6	.014 HCl	.017	+21
Nickel	6.0	.065 Ni	.07	+ 9

(*Concluded on page* 99)

TANKS FOR ELECTROPLATING SOLUTIONS

By G. B. Hogaboom, Jr. and Nathaniel Hall

THE ideal material of construction for an electroplating tank would be electrically non-conductive, would withstand heat, physical abuse and chemical attack, and would have a low first cost. Some of the types of commercially available tanks are herewith described, arranged approximately in order of increasing cost (for the plain tank).

Steel

Steel tanks are commonly made of ¼" thick (10¼ lbs.) hot rolled open hearth sheet, for larger tanks (500 gals. and over). Lighter gauges such as 3/16" thick (7 2/3 lbs.); 10 gauge, 9/64" thick (5½ lbs.); and 12 gauge, 7/64" thick (4½ lbs.) are used for smaller tanks. Weights given in parenthesis are per square foot. End and bottom joints are electric welded on the inside and outside, such joints being known as double welded. Angle iron is welded around the top to stiffen the edges. This angle is generally on the outside but can be on the inside if close spacing to adjacent tanks is imperative. Cost of a plain steel tank runs about $1.25 per square foot of inside surface area.

NOTE ON COSTS: *Actual market costs vary considerably due to differences of quality of materials, workmanship, reliability factor, transportation, delivery requirements, and special structural requirements. Very small or very large sized tanks are generally outside of the average prices given as examples. Hence costs given here are to be taken as broadly representative, and for general comparison purposes, not as actual market prices. For exact prices consult advertisers in Metal Finishing.*

When deciding on a tank size locally available, or standard, steel sheet sizes, or equal divisions should be figured on, to facilitate manufacture and to save cutting waste. Listed standard sheet width are 24, 28, 30, 36, 42, and 48 inches. Lengths are 96, 120, 144, 168, 192, 240, 360 and (except in 28" width) 480 inches.

Pitch* (poured on) lined steel, asphalt or other paints on steel are inexpensive but not entirely satisfactory especially when applied over the scale of the hot rolled sheet. Peeling and breakdown at pores generally develops.

Poured on pitch will adhere better if the tank is first warmed and also if an asphalt paint priming coat has first been brushed on and dried. Removal of the mill scale by pickling or sand blasting provides a better surface for adhesion.

Pitch-asphalt in slab form is available at costs of from $1 to $2.50 per square foot. Application is by "cementing" on with asphalt or by heating. For poured in pitch lining cost see wood tanks below.

Where a steel tank is chemically suitable but will take a deposit back of the anodes due to acting as a bipolar electrode, ¼" rough finish wire glass plates can be placed back of the anodes. The glass should be obtained in convenient lengths (3' or 4') rather than full tank side size, and should not fit tightly, to allow for difference of expansion. Glass on the ends is optional, but on the bottom is generally inadvisable as there it soon gets cracked and pulled apart from dropped work and retrieving of same. It also collects mud underneath. The cost of ¼" rough finish wire glass is about 30 cents per square foot. Standard sizes are 18" wide and in 2" increments to 48" wide. Lengths are 120" and 144".

Wood

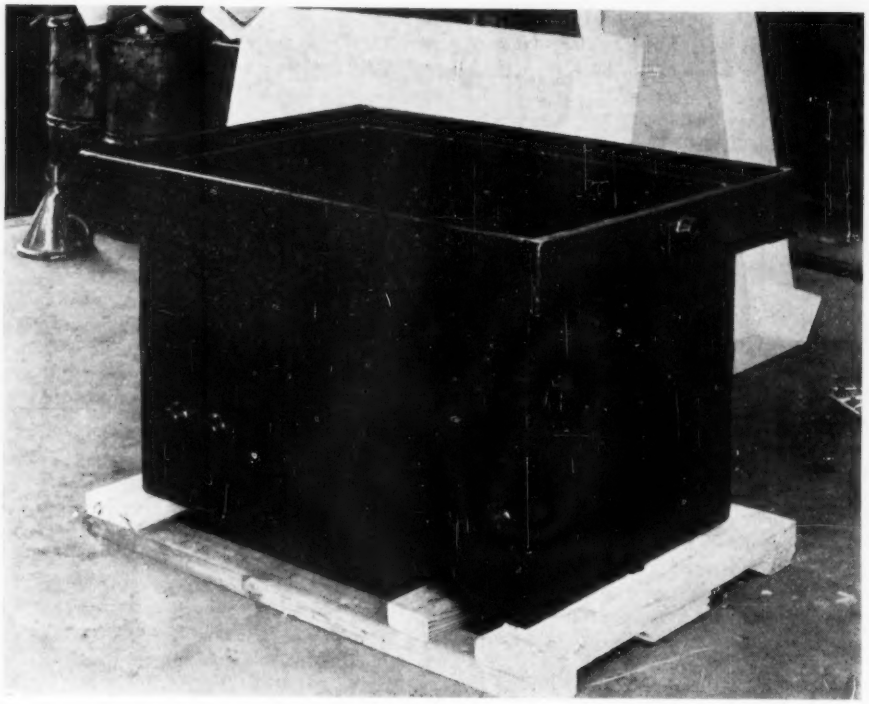
Plain wood tanks are generally made of cypress (best), redwood or fir, with steel tie rods. With the latter two woods, knots can be expected but cost is about 10% less than cypress. For tanks up to 5' long, 2" thick plank is used; for longer tanks 3" thick. For overall outside length (or width) of a wood tank five times the plank thickness should be added to the inside length (or width) to allow for battens and bolts. For estimation, a wood tank can be taken at about 50% greater cost than steel. For monel tie rods add 50% more. Unlined wood tanks are generally used and are preferred for cold and hot water rinses.

Pitch lined wood adds about 15% to cost of plain wood. Other linings in wood, such

(*Courtesy National Carbon Co.*)

Tank lined with carbon brick.

* So called "pitch" lining materials as sold for lining plating tanks are commonly a mixture of a pitch (from coal or petroleum distillation) and a natural asphalt; one of the best of these being gilsonite.



(Courtesy U. S. Stoneware Co.)

Rubber lined tank.

as lead or stainless steel are not commonly used, as such linings can be put in a steel tank at lower cost. In the case of pitch linings, the wood, not being wet with liquid, may dry out and shrink, especially if next to a heated tank. This condition together with a cold solution as will often exist in the winter, cracks the brittle pitch. Leaks of a solution of chemicals cannot be reliably repaired, and are progressive, since the salt crystals which form as the leaking solution dries, cut the fibers of the wood and the opening is enlarged.

Despite these defects, pitch lined wood tanks have been widely used for room temperature nickel plating solutions. They have the advantages of low cost (compared to the next alternative of rubber lined steel) of being electrically non-conductive, and of freedom from the possibility of introducing a deleterious metal. Pitch linings gradually flow at temperature above 90°F. They are neither good nor necessary with alkaline solutions as plain steel is suitable (except from the conductivity angle, which can be handled by using wire glass linings).

Plastic and Glass

Solid wall synthetic resin tanks such as Haveg (made from resin with asbestos or carbon filler) cost about one-third more than a rubber lined steel tank. Standard sizes are in multiple of 6". One piece tanks, with external steel ribs, are available in various sizes, a typical upper limit being 3' x 12' x 3' deep. The length can be greater if either the depth or width or both are reduced.

The chief advantages of this material are its ability to stand up to 265°F with mineral acids up to 50% strength. Special grades withstand HF, and strong alkalies.

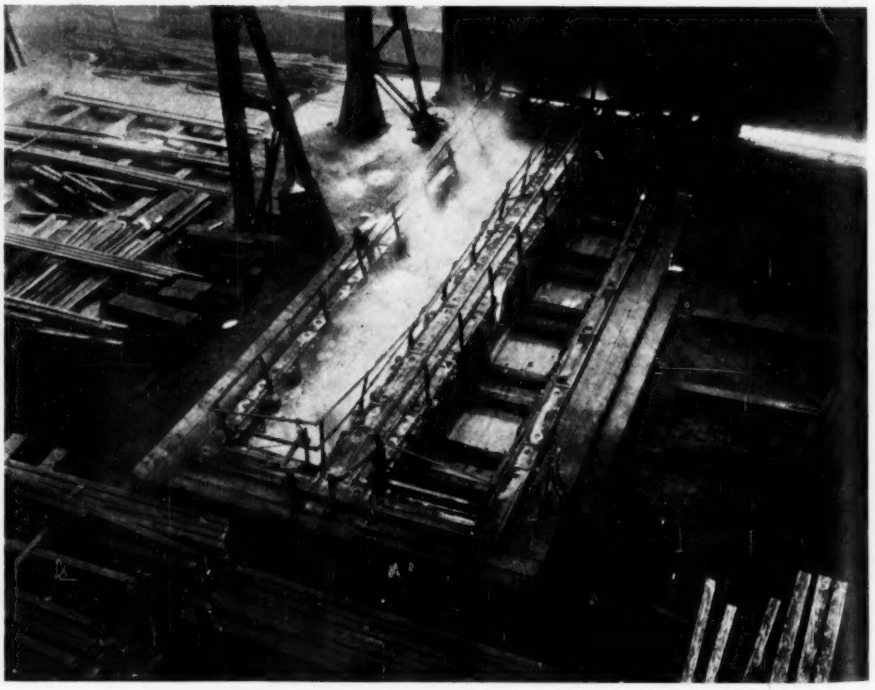
Solid wall glass tanks made of a heat treated glass plate (⅝" to 1¼" thick) are now available. This glass is stronger and withstands heavier blows than ordinary plate. A protecting glass plate is laid in the bottom. Sides and bottom are held with tie rods. Costs are approximately four times that of chemical stoneware tanks in small sizes, but in larger sizes (500 gals.) cost is only twice as much. Since glass plates are made up to 9' x 6' x 5', larger glass tanks are possible over commonly used largest ceramic tank (6½ x 3½ x 3½).

Ceramic

Ceramic, or chemical stoneware, tanks cost, per sq. ft. of inside surface area, from $3.00 for small tanks to $5.00 for larger sizes. Listed stock sizes are:

Length	*Width*	*Depth*	*Gals. (to brim)*
12"	9"	9"	4
16	12	12	10
20	16	12	16
24	16	16	26
24	20	20	40
28	20	16	38
32	20	16	44
32	24	20	66
36	28	24	104
40	20	20	69
48	24	24	119
48	32	32	210
60	24	24	149
72	32	32	320
80	40	40	550

Sudden temperature changes or mechanical shock will cause breakage of ordinary ware, although thermal shock resisting ceramic ware is obtainable, but serious results from this characteristic can be minimized by placing the ceramic tank inside a water bath tank of steel or wood. The surrounding water not only aids to support the tank but can be heated with a closed (not open) steam coil; thus the desirable feature of heating the plating solution without having coils in the solution is obtained. The water bath tank should allow 2" space for water on sides and ends and 10" space at the bottom, with coil uniformly laid in the bottom space. The water inlet pipe should be small, not over ¼", and laid so that incoming water is warmed before dis-



(Courtesy Pennsylvania Salt Manufacturing Co.)

Acid-proof brick lined tank.

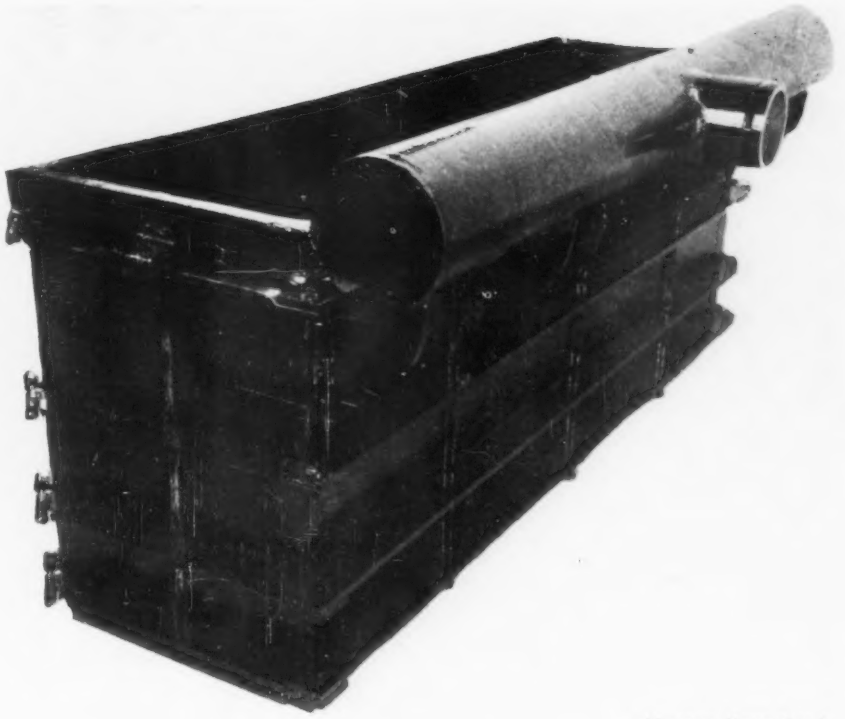
changing into the water space. Oils have been used instead of water in the surrounding bath to permit higher temperatures than would be possible with a water bath.

Crocks are generally readily obtainable and are widely used, not only for dips, but, to some extent, as plating "tanks" for special purposes such as testing, small lot work, or temporary jobs.

Unlike chemical stoneware, crocks are not impervious. They will soak up the solution they contain and salts will form on the outside. It is advisable to use a new crock when a change of type of solution is required.

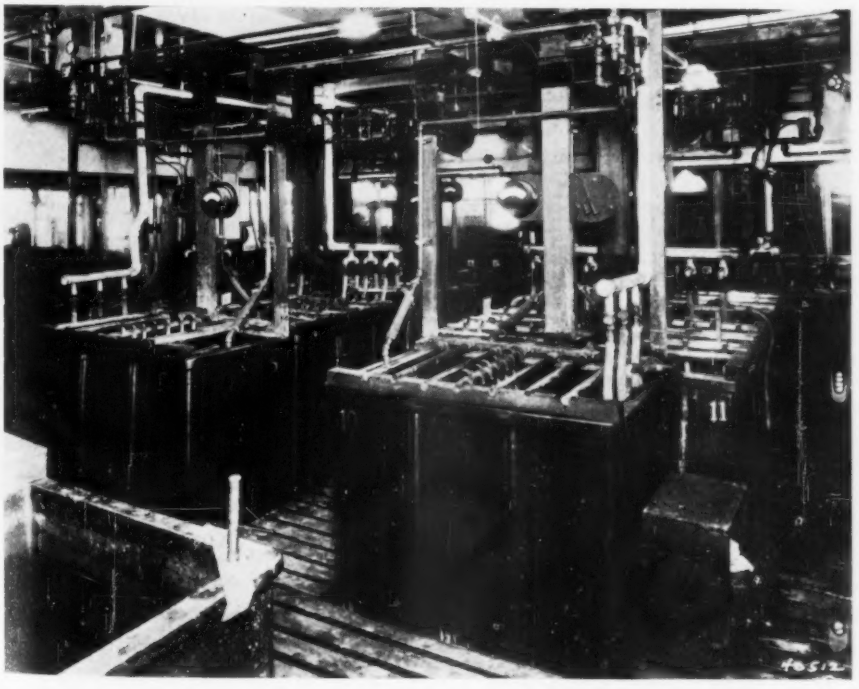
High form crocks up to 30 gal. size cost about 25 cents per gallon of capacity. Larger sizes command double the cost per gallon. Low form crocks up to 10 gal. size run about 35 cents per gallon and 60 cents per gallon for larger sizes. Some listed sizes are:

Capacity	*Approximate Inside Measurements Diameter*	*Depth*
HIGH FORM		
1 quart	4″	4″
1 gallon	6¾″	6½″
2 "	8″	8½″
3 "	9″	10½″
5 "	11″	12½″
6 "	11″	13½″
8 "	12″	16½″
10 "	14″	16½″
12 "	13½″	18½″
15 "	15″	19½″
20 "	17″	22½″
25 "	20″	21½″
30 "	20″	24½″
35 "	23″	24½″
40 "	23″	26½″
50 "	23″	30½″
LOW FORM		
6 "	14″	11″
8 "	14″	12″
10 "	15½″	12½″
12 "	17″	12½″
15 "	20″	13½″
20 "	20″	16½″
25 "	23″	17½″
30 "	23″	20½″



(Courtesy Haveg Corp.)

Haveg lined tank.



(Courtesy General Ceramics and Steatite Corp.)

Stoneware tank installation.

Tank Linings

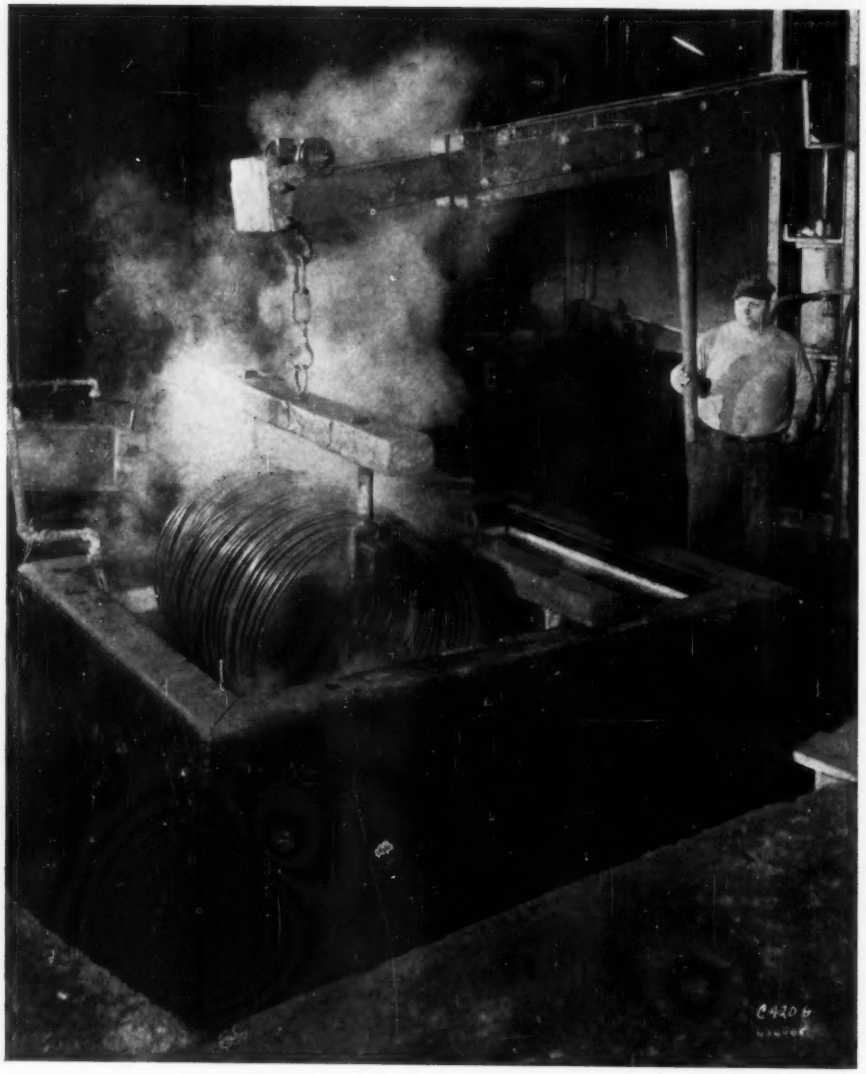
LEAD: Lead sheet of 8 lb. weight is commonly used for lining steel tanks. This is ⅛″ thick, and the lining will cost, applied, slightly more than the cost of the bare steel tank. Base price of 8 lb. 6% antimonial lead sheet is about 10 cents per pound. Heavier lead sheet can be used if required to withstand mechanical abuse. 10 lb. lead is 5/32″ thick, 12 lb. lead 3/16″ thick and 16 lb. ¼″ thick.

In autogenous lead linings the lead is burned directly to the steel and costs about $7.50 per sq. ft. It is advantageous for tank bottoms when direct flame heating must be used or for extra mechanical protection.

For chromium plating tanks, lead with 7% tin is said to have better chemical resistance. The material cost is about five times that of 6% antimonial lead. Tellurium lead has no chemical advantages for plating tanks. It work hardens and thus is advantageous where vibration, or rapid thermal changes (as in heating-cooling coils) would cause antimonial lead to creep and ultimately fail.

The widest application of lead lined tanks is for chromium plating. Their use for nickel plating is a questionable practice. Where freedom from contamination is important, as in Watt type nickel solutions (both dull and bright), lead linings are preferably avoided. With the temperature, chloride content, and current at high values, some lead is taken in to solution and this contributes towards making the deposit dark and brittle.

VITREOUS: Porcelain enameled steel tanks (sometimes called "glass" lined) cost about $1.75 to $2.00 per square foot (in-



(Courtesy Pittsburgh Plate Glass Co.)

Glass lined tank.

cludes tank) for a three coat vitreous enamel lining. When such a type of tank is desired, the enameling contractor should be allowed to furnish the tank complete, as special enameling steel is used. Also, careful preparation of the welded seams is required before enameling.

Standard stock enameled cylindrical pots up to 35 gal. size are much used for special purposes and by jewelry colorers. Although the enamel itself is acid resistant, it cannot be safely counted on not to chip and expose the steel with resultant perforation. Enameled tanks or pots are thus best used for alkaline solutions and the enamel coating is acting primarily as an electrically insulating coating, which is desirable. Alkaline solutions, however, gradually attack enamels, especially where a heating flame strikes, so that a steel plate between flame and tank bottom is desirable.

RUBBER: Synthetic or natural rubber linings for plating tanks are generally 3/16″ or ¼″ thick and are of a semi-hard grade. Full hard rubber, obtained by high sulfur and other chemical additions, has superior chemical and ageing resistance but is brittle. The cost of rubber linings of the standard laid-in sheet and vulcanized to the steel type, is about $2.50 per square foot for ¼″ thickness and about 30 cents less for 3/16″.

Rubber has proved the most generally satisfactory, electrically non-conducting type of lining for plating tanks. Continued operation at temperatures above 160°F. is not recommended. For higher temperature service (as with the iron chloride plating solution) an acid brick lining is put over the rubber as a thermal insulator. This type of construction also provides mechanical protection for heavy duty work.

Since the properties of a rubber lining depend on the materials and methods of compounding (on each of which each manufacturer has his own variety of conditions) it is important to specify the use to which a rubber lining is to be put. If for a proprietary plating solution, the type rubber recommended by the supplier of the solution should be obtained.

Mineral oils will attack natural rubber linings (less attack on synthetic rubber linings), but oil will normally float and be skimmed off the usual solution. Solutions containing wetting agents, however, will emulsify the oil, which will then cause the rubber to be softened and contaminate the solution.

PLASTIC: Synthetic resin ("plastic") type linings are finding increased use, despite higher cost (averages about 40% more than rubber). Advantages are ability to withstand oils, ageing and a wide variety of corrosive materials. If damaged, the lining can be repaired.

BRICK: Acid brick linings when applied direct to steel cost about 40% more than rubber. This construction is generally not advised as a slight crack, failure of a joint, or porosity, subjects the steel to attack. Hence, the steel should first be lined with a chemically resistant coating (or "membrane") such as an asphalt type, lead, rubber, or synthetic resin. If the brick lining is desired only as mechanical protection for the undercoating, some saving can be obtained by brick covering the bottom only, since in plating tanks the likelihood of damage to the sides is not great.

STAINLESS STEEL: Stainless steel (18% Cr—8% Ni) is generally used in the form of a 20 gauge (.037″ thick; 1.6 lbs./sq. ft.) lining for a plain steel tank, or the stainless can be supported in an angle iron framework with a cypress wood bottom.

Size of tanks should be figured so that sheet sizes available to the fabricator can be used. Listed widths are 24, 30, 36, 42, 44 and 48″, lengths are 96 and 120″. While the material cost of 20 gauge sheet in less than 100 lb. quantities is about 60 cents per pound, the cost of fabricating brings the cost of a tank lining to as high as $4.00 per sq. ft. of inside surface.

CARBON: Carbon brick lined steel tanks, with a synthetic resin type coating between the brick and the steel, cost about 75% more than a steel tank with a full service thickness of a straight synthetic resin lining. The carbon brick adds mechanical protection. Its chief advantage is its resistance to the mixture of hydrofluoric and nitric acids used in pickling aluminum and stainless steel. Synthetic resin type linings also withstand this combination.

GLASS: Glass lined steel tanks are essentially a steel tank into which a glass tank is placed, and the space between filled with a special compound. Their cost is accordingly above that of the straight glass tank.

PROTECTIVE VALUE OF ELECTRO-TIN AS AN UNDERCOATING

By S. WERNICK, Ph.D., M.Sc.

CONCLUSION

As a result, it was possible to plot the variation in deposit thickness in the case of each strip, No. A1, A2, etc., to A12; B1, B2, etc., to B12; and so forth. The resultant curves give a direct pictorial representation of the variation in thickness of the deposits over the surface of the coating, and on study revealed the following interesting points.

(1) Comparing Figs. 3 and 4 it will be seen that whereas the thickness drops somewhat sharply as the right-angle bend in the test piece is approached in the case of the all-zinc deposit, there is a more gradual approach to the bend when the under-coating of tin has been applies; in other words, the zinc deposit is more evenly distributed.

Similar curves which were obtained with nickel-zinc (Fig. 5) and copper-zinc (Fig. 6) composite deposits respectively, utilizing the same thickness of undercoating, i.e., 0·0001" of nickel and copper respectively, show an even sharper drop in thickness as the bend is approached than does the all-zinc specimen. These therefore suggest that neither copper nor nickel as an undercoating to the protective deposits zinc or cadmium is likely to improve the corrosion resistance.

For comparison, the marked drop in thickness which occurs with a pure nickel deposit is shown (Fig. 7). This reveals a startling lack of uniformity and confirms the importance of depositing a considerably heavier thickness of nickel than that which represents the average thickness applied over the whole of the surface area.

These analyses of the metal distribution thus fall in line with the previous finding that the undercoating of tin influences the distribution of the subsequent deposit favorably, and it is suggested that the effect on the distribution of the subsequent deposit is one of the prime factors in increasing corrosion resistance. The effect is probably related to the higher hydrogen over-voltage of tin comparative with the ferrous basis material.

Practical Applications.

As far as can be seen, there should be a fairly considerable application for the composite tin-zinc or tin-cadmium deposits as superior rust preventives. While it is not suggested that it would be desirable for all zinc or cadmium deposits to be preceded by a tin undercoating, since for most purposes zinc or cadmium plate amply fulfil their purpose, offering the necessary service which is required of them, it is thought that where highly corroding conditions are likely to be encountered it may be well worth while to consider the specification of a composite deposit.

There are a number of practical considerations which require to be envisaged in specifying such a composite finish.

The first is the obvious fact that the finishing process becomes a two-stage process instead of the single direct deposition of zinc or cadmium respectively. It thus entails the upkeep of an additional electrolyte, auxiliary plant therefor, etc. Where a tin-plating unit is already available, these are not major considerations, but the time factor enters in any case, since the period of plating is necessarily somewhat increased.

These considerations may, however, be relatively unimportant where special components have to be treated to withstand difficult atmospheric conditions, e.g., such as are met with in tropical or marine atmospheres, and in such cases the benefits derived may well merit the extra time and cost involved.

The use of a two-stage process also carries with it the possibility that if the second deposition process is not carried out satisfactorily or sufficiently rapidly after the initial application of the tin deposit, then stripping or blistering of the zinc or cadmium may result. Normally, however, if the components are taken out of the tin vat, and carefully swilled in clean cold running water before being placed in the zinc or cadmium solution (through which current should preferably already be flowing), the possibility of defective deposits resulting is small. On the other hand, if the parts have to be kept for any time before being passed to the zinc or cadmium bath, they should be care-

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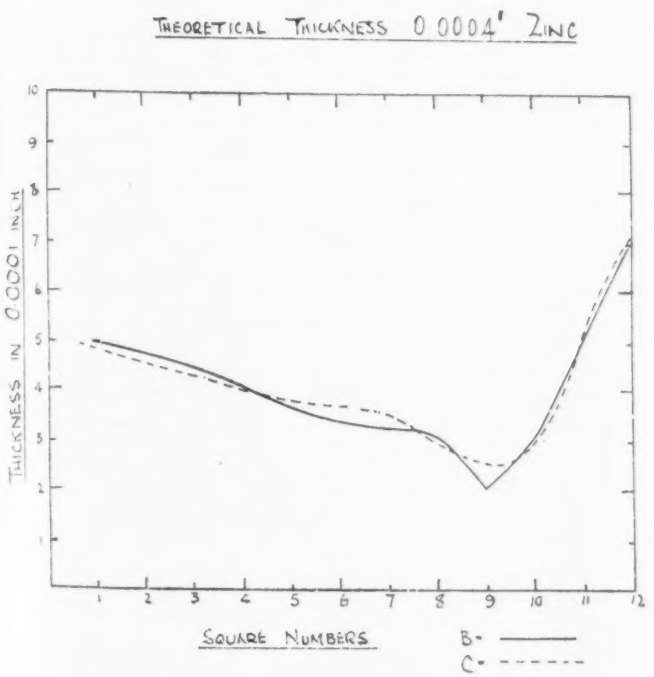


Fig. 3.

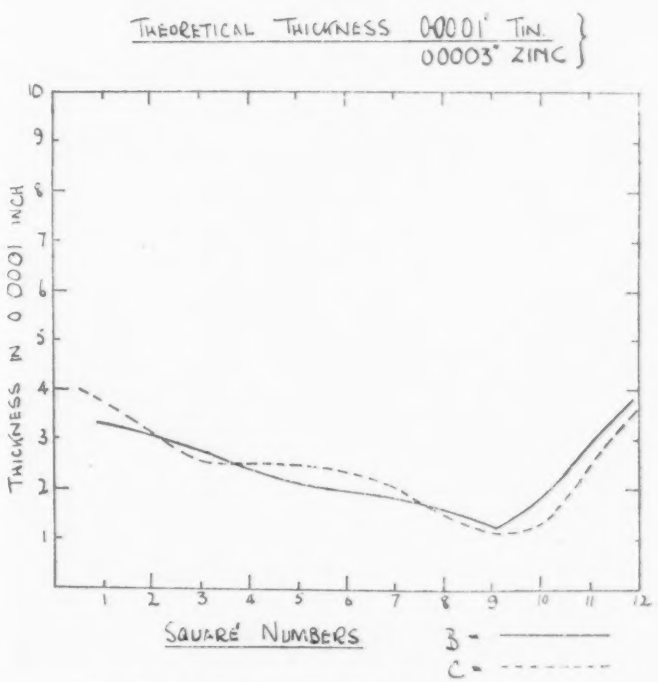


Fig. 4.—Distribution of Zinc Deposit on Test Piece.

"Where Are the Polishers"—An Answer

By E. E. OATHOUT

Methods Engineer, Behr-Manning Corp., Troy, N. Y.

THE real question isn't "Where are the polishers?" It is, "What can we do about the polisher shortage—right now?"

There is nothing about the current shortage of polishers which can't be remedied with a four year crop of developing polisher apprentices. You can't train polishers in foxholes, so it is undoubtedly true that the polishers have departed along with plumbers, electricians, and the other craftsmen whose skill requires long apprentice training. This, of course, is all very reassuring for the electroplating industry in 1950, but what about February, 1946? What about a tremendous electroplating industry freed on V-J Day from government restrictions forbidding the plating of consumer goods and besieged on all sides by production and sales departments to build again consumer merchandise with the greater sales appeal, utility, and long life which plating and polishing adds? What are they going to do now? Are they going to settle for inferior polishing work, with the resultant depreciation in overall quality? Are they going to sit back and permit non-plated finishes to usurp their market for the next four years?

No, the electroplating industry is going to do the same thing that the rest of American industry did during the war years when skilled help was not available. They are going to use their good old Yankee ingenuity to build and utilize machines and methods which will transfer the skill requisite from the operator to the machine. Just as automatic and semi-automatic lathes and machine tools with almost human controls, stops and adjustments permitted inexperienced women operators to perform machining jobs formerly requiring expert machinists, so will the electroplating industry solve its polishing problems.

Polishing shuttle part on pedestal mounted Porter Cable bench unit.

Grinding reverse ratchet wrench.

The quickest and best solution to the present shortage of polishers is merely to so simplify the polishing operation itself through the introduction of recently developed polishing methods as to permit lower skilled personnel to produce first quality finishes and at the same time to permit skilled polishers to produce more and better work through accentuating their present skills.

That answer is conversion from abrasive coated set-up polishing wheels to factory coated abrasive belts and cushioned grind contact wheels through the use of Idler Backstands. Repeatedly demonstrated on field engineering tests at electroplating establishments, conversion to the abrasive belt method has consistently shown this production increase and this improvement in job quality for all operators resulting from this modification and simplification through the transfer of skill to the machine.

Production improvements for the abrasive belt method averages conservatively at about four to one over set-up polishing wheels, but often amazing improvement figures crop up. A recent "believe it or not" report came to our attention in which an eastern manufacturer working on a contract for armor-piercing shell fuses converted from set-up wheels to backstands, permitting the use of a simple jig which increased production from 400 per day for thirteen men to 8,000 per day for two men.

More typical is the case of a West Coast electroplater with a difficult job on aircraft parts. Reading from our Field Engineer's report is this statement, "The shop could not do the job on set-up wheels at four times the price. Only one operator was skillful enough to keep rejections below 25%. The only other method for doing this job satisfactorily is precision grinding equipment with expensive

fixture. Conversion to coated abrasive belts and backstands tripled production over the original time study estimate with satisfactory reports from the Inspection Department for all operators."

A maker of furnace grilles reported a production increase of 354% after conversion to abrasive belts, with a tremendous improvement in work quality and fewer plating failures. In one case a scissors grinder couldn't even accept a contract to make sheath knives using the conventional set-up wheel method but later cut the polishing costs 60% below contract estimate by converting to belts.

Why the Belt Method is Better

The engineering explanation of the superiority of the abrasive belt method over the set-up polishing wheel method recognizes three major improvement factors. First, the factory belt coating is perfectly uniform and bump free. It is considerably sharper and tougher, and therefore capable of faster, cleaner, cooler cutting with better finishes. Secondly, the resilient contact wheel which replaces the set-up wheel in the belt conversion offers several degrees of controlled density (softness or hardness) which contrasts strongly with the hard, shell like surface of the set-up polishing wheel, requiring as it does the breaking up of the coating into numerous cracks. Thirdly, increased belt area over polishing wheel area is in the ratio of four to one. This means that an individual cutting grain on an abrasive belt contacts the work one-quarter as many times as a corresponding grain on a set-up wheel at the same number of surface feet per minute. This means much cooler and more effective cutting with greatly prolonged life.

The conversion to coated abrasive belts through the use of an idler backstand pulley is an extremely simple task. A cloth contact wheel of the correct resiliency is merely mounted on the lathe spindle in place of the set-up wheel. The idler backstand is then installed on the floor, wall or ceiling approximately four feet from the lathe spindle and so placed as to permit running the endless abrasive belt over the two. The contact wheel thus becomes both a drive pulley and a work wheel.

Types of Idler Backstands

Backstands fall into four main types, each adapted to the specific need of the particular floor plan or set-up. These include floor, wall, ceiling, and bench backstands. The floor type backstand, as the name implies, is a unit incorporating a substantial base, supporting column, and idler pulley for installation in back of a floor type polishing lathe or jack. Several types of backstands are available with both counterweight and spring controlled belt tension features. Belt trackage is made possible by both direct and remote controls, depending upon the model employed. Some manufacturers have incorporated an additional pulley on the backstand column for the purpose of conserving floor space and adding belt length.

Grinding scale from O. D. hot welded steel motor frames on Rome wall-type backstand.

Before and After View. Typical pieces polished on abrasive belt and idler backstand unit.

The wall and ceiling type backstands are provided for installation where a lack of space prevents consideration of the floor type, or when, for some particular requirement, it is desirable to have a coated abrasive belt operate in a vertical plane or at an angle which cannot be provided by the floor type model.

Bench backstand units consist of a bench lathe, idler pulley or pulleys, and contact wheel. These units are designed for light duty grinding and finishing operations where the heavier type of equipment is not required and smaller belt sizes are acceptable. Durably constructed, they are ideally suited for a wide variety of burring, grinding and polishing jobs in the metal-working field.

The versatility of the bench backstand unit makes it most acceptable to the trade in general as it may also be readily converted to the use of a grinding wheel, wire wheel, or buffing wheel. Platens may also be used between the idler pulley and contact wheel for sanding flat work. The resiliency of the coated abrasive belt in operation over the compressed canvas contact wheel is said to appeal especially to operators grinding and burring small parts.

Bench grinders can likewise be converted to small idler backstand assemblies by mounting a 6 or 8 inch diameter recessed contact wheel in place of a grinding wheel and installing a bench backstand directly behind the grinder. Such mountings should be made to accommodate belts measuring $2\frac{1}{2}$ inches wide by 48 or 60 inches long.

Speed and Horsepower

The average lathe operates at from 1,800 to 3,600 r.p.m., slower speeds being used for grinding and higher speeds for polishing and buffing. Most contact wheels are limited to a speed of 7,500 s.f.p.m. (12-inch diameter wheel at 2,400 r.p.m. or 14-inch diameter at 2,000 r.p.m.). The r.p.m. of the lathe must, therefore, be considered in conjunction with the diameter of the contact wheel to be used in order

Polishing cast iron furnace grilles prior to plating.

Grinding weld seams on metal cases—Hammond backstand (Rome backstand mounted on left handle spindle).

that the proper cutting speed of the coated abrasive belt be maintained. (Formula: s.f.p.m. = r.p.m. × diameter × 0.2618.) Experience has shown that, in general, the coarser grits (24-X, 36-X) give maximum performance at slower speeds (approx. 4,500 s.f.p.m.) while the finer grits (80-X, 100-X, 120-X) produce superior finishes when operated at higher speeds (approx. 6,000 s.f.p.m.). The condition of the equipment in the plant in which the conversion job is being done should, of course, be taken into consideration when recommending higher speeds.

Power requirements are dependent on the type of work being done and whether one or two spindles are available. There are single spindle motors of 2½ to 5 h.p. in use with grinding or wheels which can be converted to the use of coated abrasives general, a minimum of 2½ h.p. per spindle is required for average coated abrasive grinding or polishing operation. There double-spindle lathes operating two backstand idler pulleys require a minimum of 5 h.p. However. where heavy duty gri or the combined use of rag polishing wheels and coated abrasive is contemplated on a two-spindle lathe, additional power is sary; 7½ to 10 h.p. is suggested.

New York Job Platers Hold Banquet

The annual banquet of the *Masters' Electro-Plating Association* was held on Friday, December 14, 1945 at the Park Central Hotel, New York. Approximately 140 people attended.

One of the features of the evening was a presentation of an engraved placque to *Walter Plumacher* of *R. Plumacher & Sons*, New York, in recognition of his unique and valuable services to the plating industry, and the fact that his firm is now almost 50 years old. At the same time an orchid was presented to *Mrs. Plumacher* in recognition of her aid and importance to the firm of R. Plumacher & Sons. Plumacher, in acknowledging the monial, introduced his mother, *Mrs. Plumacher,* as one of the founders of company, almost 50 years ago.

A very pleasant evening was enjoyed all of the attendants.

THIS IS WASHINGTON—

By George W. Grupp
METAL FINISHING's Washington Correspondent

Activated Carbon Discussed By Helbig At the January meeting of the Baltimore Washington Branch of the A. E. S., held in Washington, the members heard W. A. Helbig, chemical engineer of the Darco Corporation, deliver an informative talk on "The Nature and Production of Activated Carbon and Its Application in Plating Solutions," which he illustrated with an actual demonstration of filtration with activated carbon. In his talk Mr. Helbig dealt with the methods and materials used to produce activated carbon; the advantages and disadvantages of activated carbon; its uses in various industries; its application in metal finishing solutions; the principles of filter operation; the solids capacity of a filter; the effective filter area; the elements of filter operation such as recirculation, precoating, measuring filtration rate, pressure regulation, flow rate, handling of filter discharge and temporary filter shutdown; methods of removing different kinds of undesirable impurities from plating solutions; the use of wetting agents; and the effect of activated carbon on chromium solution and brightness. George Milo Keller did his best to bring out a big crowd to hear this interesting talk by Mr. Helbig, but the Baltimore meeting in December is still tops when it comes to attendance.

Baltimore-Washington Branch Makes Headway on Its Membership Campaign The Baltimore-Washington Branch is making headway in securing sustaining and active members. Letters are being followed up with personal calls by members of the Branch. The members are also soliciting firms to put on exhibits at the annual convention of the American Electroplaters' Society in Pittsburgh this forthcoming June. Fred Pierdon of Washington has donated his complete set of the monthly *Review* to Pratt's Library in Baltimore.

Annual Meeting and Banquet of Baltimore-Washington Branch Will Have 200 Present From present indications the annual meeting and banquet of the Baltimore-Washington Branch will be the best and biggest in the history of the Branch. No less than 200 are expected to attend this event which will be held at the Maryland Yacht Club, Broening Park, at Hanover Bridge, Baltimore, Md., on Saturday, February 16, 1946. The educational session, which will begin at 3 p. m., will be addressed by Walter Pinner, Supreme President of the American Electroplaters' Society, on the subject of "High Speed Bright Nickel Plating from High Chlorine Ion Baths"; by Robert Ehrhardt, Finish Engineer of the Bell Telephone Laboratories at Summit, N. J., on "Plating on Aluminum"; and by Frank Mesle of the Oneida Limited of Oneida, N. Y., on "Heavy Silver Plating of Bearings." Frank Davey, Brad Clark and Jules Horelick of the Banquet Committee, have arranged for a good dinner, for an hour's floor show, and for a dance for the members and their guests. A ladies' committee is in the process of being appointed, which will provide the ladies with an afternoon of fun while the members attend the educational session.

Excess Profit Taxes Must Be Paid Before Refund Claims Can Be Made The United States Tax Court, on January 16, 1946, ruled that if a corporation wishes to obtain a review of its claim for excess profits tax relief under Section 722 of the corporation income tax law the tax must be paid before refund claims can be made.

Anti-Labor Legislation May Be Passed If Industrial Peace Is Not Restored If labor troubles continue to mount, and obstacles in the way to industrial peace are not overcome then, as Representative Randolph of West Virginia put it, "some vicious anti-labor measure might be passed."

How Full employment Will Be Realized A committee of the Chamber of Commerce of the United States recently submitted to the Chamber's board of directors a report which states that "To assure an adequate supply of job-opportunities several conditions must be met: 1. Durable peace and settled international relations; 2. A stable monetary unit and public confidence in the currency; 3. Reasonable taxation and settled tax policy; 4. Adequate expectations of rewards for undertaking the job-making risks; 5. Settled rules of the game to encourage long-term commitments; 6. Settled wage and labor policies; 7. Freedom of entry into the goods and labor markets and the preservation of the competitive motive; 8. Enough people who want to become employers."

As Schindler Views 1946 Under Secretary of Commerce Alfred Schindler expressed the opinion that the present economic trends are "(1) The vast sources of purchasing power in the face of tremendous backlogs of deferred demands, and the serious threat of 'inflation' in the first six months of this year. (2) The encouraging signs of production leading to a lessening of the danger of inflation as production catches up with demand. (3) As the backlogs of deferred demand for durable goods are worked off, the danger of 'deflation' and a possible serious post-war decline." And he also stated that "In 1946 we should confine our savings, and bank credit should be used to finance, increasing employment . . . expanded markets and consumption of goods and services and we should not think so much in terms of immediate speculative advantages. Business men should think of having a good average profit the next five or ten years on expanded volume and not so much of a get-rich-quick profit in the next twelve months on a limited volume."

Retention Over Scarce Materials Sought Efforts are being made by the Office of War Mobilization and Reconversion and the Civilian Production Administration for the retention of controls over the supply of materials which are short. CPA may pass out of the picture this forthcoming May, but some sort of legislation may be passed to carry on materials control after the liquidation of the CPA. However, CPA is hoping that some measure will be passed creating it an independent agency to carry on as a materials controlling agency. If not, Congress may pass on such functions to the Department of Commerce.

Wage Stabilization Board Created When the War Labor Board died from labor trouble fatigue on December 31, 1945, President Truman immediately appointed a wage stabilization Board with W. Willard Wirtz and Sylvester representing the public; Earl Cannon and R. Randall Irwin representing industry, and Robert J. Watt and Carl J. Shipley representing labor. The standards which the new Board is expected to use in passing on wage increases are (a) to compensate for increased living costs; (b) to correct inequalities of wages in different plants, and (c) to ease labor shortages.

Prices Are Expected To Rise 6 Per Cent In 1946

The Office of Price Administration is embarking on a crucial stage in its history because prices in 1946 are expected to rise at least 5 per cent due to increased production costs. And to prevent a price bulge the OPA officials have determined to double their efforts to hold the line.

As Wallace Views 1946

As we embark on the new year this is how Secretary of Commerce Henry A. Wallace views 1946. He says: "The process of shifting and adjustment is still in progress, and may be expected to continue throughout the new year. Our major problems to be overcome include the speeding up of output in the reconverted industries; the reemployment into civilian occupations of the millions of veterans; the holding of the line against inflation until such time as this danger is removed by the greatly enlarged flow of goods and required services; and the development of balanced relationships between prices and costs so as to lay the basis for extending business prosperity after the impetus now imparted by deferred demands arising from the war has spent its force."

Federal Tax Revision Unlikely in 1946

Senator Robert Taft and other members of Congress have expressed the opinion that a major revision of the Federal Income tax is not likely in 1946. However some pressure exists for special technical revisions such as income tax adjustments procedure. But no plans are being made to reduce taxes.

Many Controls Will Be With Us in 1946

During 1946 the Civilian Production Administration does expect to revoke controls under M-300 Chemicals and allied products; M-384 Lead chemicals; M-387 Rosin; L-63 Suppliers' Inventories; M-89 Corundum; M-285 Uranium; M-293 Scheduling reports; M-43 Tin; and M-112 Antimony. By July, 1946, it is possible that the following orders may be revoked: M-38 Lead, and M-235 Tinplate scrap.

1946 is Expected to Be Banner Year

Some economists are of the opinion that consumer expenditures for goods and services will exceed $100,000,000,000 in 1946 if strikes, reduced productivity per man-hour, and government controls do not throw monkey wrenches into the machinery.

Metal Finishing in 1946 Will Be Better Than in 1939

Experts are of the opinion that the metal finishing industry in 1946, when compared with 1939, will show a 37.5 per cent increase in volume of production, a 30.4 per cent increase in employment, a 18.6 per cent increase in unit cost of finishing, a 14.2 per cent increase in sales and distribution costs, and a 11.5 per cent increase in selling or service prices.

New Construction Should Stimulate Plating Business

With a forecast of a $7,500,000,000 construction program as compared with $4,751,000,000 construction program of 1945, the finishing industry should come into a fair amount of plating work on hardware and lighting fixtures.

Office of Small Business Ready To Function

Secretary of Commerce Henry A. Wallace announced on January 15, 1946, that the Department's Office of Small Business, which took over some of the functions of the Smaller War Plants Corporation is prepared to offer business men aid and guidance on such important problems as sound business techniques . . . general administration, production, buying procedures, inventory practices, methods of selling, market sources, and economic opportunities.

War Facilities Expansion Reviewed In Pamphlet

The Civilian Production Administration recently completed a booklet called "Facilities Expansion—June 1940—June 1945." This booklet gives an excellent compact picture of war plant expansion. It tabulates the commitments or facilities initiated; the value of facilities put in place; the cost of facilities initiated; and the value of construction and equipment according to industries. It also deals with the expansion procedures, adjustments, and projections.

Smaller War Plants Corporation Now History

In abolishing the Smaller War Plants Corporation the SWPC functions of lending and surplus property operations will be taken over by the Reconstruction Finance Corporation; and its technical and other small business activities will be taken over by the Commerce Department.

Inventory Regulation Amended

Directive 6 to PR-32 was issued by the Civilian Production Administration to amend the inventory control which granted a 30-day period for establishments in which work stoppages have occurred to postpone or cancel material orders to permit continued receipt of materials after resumption of production.

Informative Labelling Is Said to Be a Means to Full Production

Alfred Schindler, Under Secretary of Commerce, recently advocated that advertisers adopt a program of "informative labeling," and to base their consumer appeal on the quality of their products or services rather than on the features that give their products or services, what he called "meaningless and costly individuality." He is of the opinion that "there has been too much heat and too little light on the questions of informative or descriptive labeling, on simplified practices and on commercial standards." This he followed with the warning: "Unless there is a clearer understanding of how these practices can advance sales then we are not going to have the full production and full employment that is within our grasp."

Government-Owned Patents and Processes Will Not Be Declared Surplus

On January 4, 1946, the Surplus Property Administration reported to Congress that no Government-owned patents, processes, techniques and inventions have been declared surplus. And it is not likely that any of them will be disposed of as such.

Credit Guide Issued By Commerce Department

The Department of Commerce has just issued a booklet celled "Credit Sources for Small Business" which can be obtained by sending fifteen cents to the Government Printing Office, Washington 25, D. C. This pamphlet deals with such subjects as the small business credit problem, the types of credit, what one should pay for credit, how to choose a bank, how to deal with private sources of credit, and how to obtain funds from public sources.

Government Has Free Use of Alcoa Patents

An agreement has been entered into between the Aluminum Company of America and the Reconstruction Finance Corporation in which Alcoa agrees to give the Government free use of its patents for the making of alumina from bauxite, and that the RFC has the right to sub-license the patents to any company leasing Government-owned plants. As a result of this agreement Reynolds Metals Company will take over the Hurricane Creek, Arkansas, plant, and the Jones Mills, Arkansas, plant.

Human Demobilization and Reconversion Discussed in Washington A conference of State representatives was held in Washington on February 4th and 5th by the Retraining and Reemployment Administration of the Labor Department to further Federal-State cooperation in serving veterans and displaced war workers. As a result of this conference the Administration expects to take specific steps to improve cooperation among governmental agencies concerned with demobilization and to meet the critical shortage of trained advisory center personnel.

Patents For Sale Or License The United States Patent Office recently had entered in its register of patents available for licensing or sale Patent No. 1,898,500 which covers a process of applying colors, in a dry or powdered state, into enamel coatings applied to refrigerators and ranges. It also has recently entered Patent No. 2,348,465 which covers a process of treating articles for the removing of grease and oils.

5,000,000 Are Expected to Be Unemployed By June Government labor experts estimate that 5,000,000 will be unemployed by June, 1946. Sometime ago they estimated it would reach 8,000,000 by the spring of 1946. It is also their opinion that employment in 1946, in all industries, except the construction and agricultural industries, will be at the level of 1940.

Prices Will Increase Because of the rising costs of production the level of prices is bound to go up. No one seems to know what raw materials will cost in the future because of this upward pressure of prices due to the increased production costs. The demands of labor will be soon felt in prices.

Silver Prices May Be Increased Further hearings are to be held on the subject of legislation which would permit an increase in the selling price of silver for industrial purposes. Some believe a compromise price will be accepted, which will be somewhere between 71.11 cents and $1.29 an ounce.

Copper to Be Imported In the near future the Civilian Production Administration expects to authorize the importation of copper at the rate of 50,000 tons per month. CPA states that the combined copper stockpile of the Government and industry totaled 662,900 short tons on November 30, 1945. This the CPA officials say will be consumed in nine months because the present rate of monthly consumption is 73,000 tons.

Nickel Sulphate Supply Short The supply of nickel sulphate and zinc sulphate is very short because of the increasing demand for both of these chemicals.

Dutch Tin Mines Progressing Information has reached Washington from Tandjoengpandan, Billiton Island, Dutch East Indies, that the restoration of the island's tin mines is in progress with several hundred workers regularly employed.

Tin Control Eased The Civilian Production Administration reports that at the end of 1945 the Government stockpile of pig tin subject to allocation amounted to 20,000 tons. The dipping into the Government stockpile is possible because tin conservation Order M-43 was amended on December 29, 1945. At the same time CPA revoked Directive 4 to M-43 as its provisions are now incorporated in Schedule IV of the Order.

Lead Prices Are Expected to Go Up Some are predicting that higher prices will have to be paid for lead if the OPA price ceiling is removed on June 30, 1946. Domestic high-grade lead ores are said to be close to exhaustion and imports will become more and more necessary to supply domestic wants.

Industrial Silver Demands According to the experts the demand for industrial silver in 1946 will be about 45,000,000 ounces in excess of domestic production. During 1945 the consumption of silver for industrial uses amounted to approximately 140,000,000 ounces. During the first eleven months of 1945 the Government stockpile supplied industry with a little more than 72,000,000 ounces.

Lead Supply is Short The Bureau of Mines of the Department of Interior estimates that 1,000,000 tons of lead will be needed by industry in 1946. The present rate of domestic production is 32,000 tons a month. As a result there is bound to be a lead shortage.

Copper Consumption In 1946 Will Be About 1,200,000 Tons Government officials are of the opinion that from 1,100,000 to 1,200,000 tons of copper will be consumed by industry in 1946. Over 300,000 tons of this copper, it is estimated will be consumed by electrical equipment manufacturers.

Small Scale Tin Production Started In Far East A representative of Billiton Tin Company reports that small scale tin production has been restored on Singkep Island of the Riouw Archipelago. Lacking electric power, hand tools are being employed.

Zinc Stockpile Increases and Production Decreases The American Zinc Institute reports that the production of zinc for 1945 totaled 799,462 tons as compared with 901,330 tons in 1944, and with 971,873 tons in 1943. The stockpile of zinc has increased steadily from 173,510 tons in 1943 to 259,333 tons in 1945.

Tin Controlled By International Committee During the first week of the new year an international tin committee was organized to take over the functions of the Combined Raw Materials Board as it concerns the allocation of tin ores and concentrates. The committee consists of representatives of Belgium, France, Netherlands, United Kingdom, and United States. The only tin smelter in the United States, located at Texas City, Texas, is only able to supply refined tin at the rate of one half of our 1939 demand. Metals Reserve Corporation contracts will keep the Texas smelter in operation for a little over a year. The progress of the restoration of tin smelting in the Far East is progressing rather slowly.

Cadmium Consumption in Excess of Production The Civilian Production Administration recently revealed that cadmium is being produced at the rate of 7,200,000 pounds per annum. Current consumption, CPA estimates, is at the rate of 8,000,000 pounds per annum. The Government stockpile of cadmium has declined steadily from 1,261,300 pounds on July 1, 1945 to 846,300 pounds on January 1, 1946.

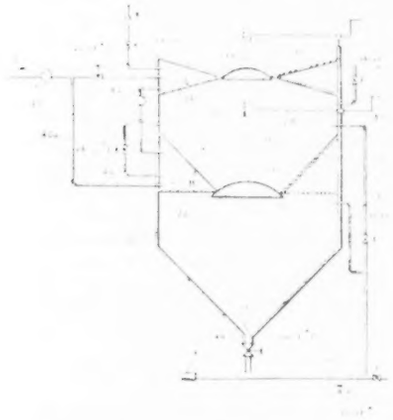
Cadmium May Again Be Placed Under Control The Cadmium Industry Advisory Committee of the Civilian Production Administration, at their meeting in Washington on January 9, 1946, recommended the reinstituting of modified controls on the distribution of cadmium to prevent a serious impairment of the Government stockpile. When this new order is issued by the CPA it is expected that it will read like a modified Order M-65 which was revoked on August 20, 1945.

Porcelain Enamel Product Shipments Are Increasing The Department of Commerce's Bureau of Census reports that during the first ten months of 1945 the shipments of porcelain enameled products amounted to $32,013,109 as compared with $29,025,292 for the same period in 1944, and with $24,989,487 for the same period in 1943.

Patents

Sandblasting

U. S. Pat. 2,389,616. G. Franklin, Nov. 27, 1945. Apparatus for continuously delivering granular material, said apparatus comprising a container, means for maintaining superatmospheric fluid pressure therethroughout, means for containing a mass



of said material, means providing an orifice through said containing means, means for connecting said orifice-providing means and the container, and means for supplying liquid to said material before it is delivered through said orifice, said containing means and said orifice being so positioned that said material and said liquid may pass together by gravity through said orifice and into said container.

Plating Baths

U. S. Pat. 2,389,180. H. Brown, assignor to The Udylite Corp., Nov. 20, 1945. In a process of electrodepositing metals, the step which comprises electrolyzing an aqueous acid solution of a salt of the metal to be deposited and a minor proportion of a soluble sulphoacetate of a water-soluble aliphatic polyhydric alcohol partially esterified with a fatty acid containing from 12 to 14 carbon atoms, the metal to be deposited being selected from the group consisting of nickel, cobalt, iron, zinc, cadmium, copper, and antimony.

Plating Baths

U. S. Pat. 2,389,181. H. Brown, assignor to The Udylite Corp., Nov. 20, 1945. In a process of electrodepositing metals, the step which comprises electrolyzing an aqueous acid solution of a salt of the metal to be deposited and a minor proportion of a soluble aliphatic alkyl ether sulfonate containing an alkyl radical having a chain of from 6 to 18 carbon atoms, the metal to be deposited being selected from the group consisting of nickel, cobalt, iron, zinc, cadmium, copper, and antimony.

Agitating Pickling Tanks

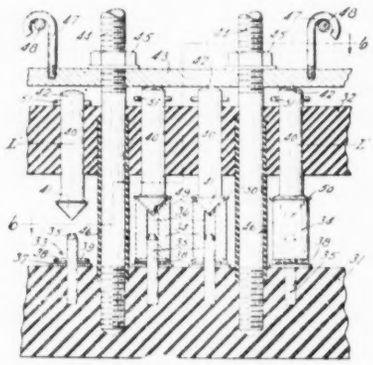
U. S. Pat. 2,389,488. W. H. Dailey, Jr., Nov. 20, 1945. The method of agitating a pickling bath and controlling the temperature thereof which comprises forming a homogeneous mixture of steam and a gas non-condensable at the temperature of the bath, conducting said mixture to said bath, introducing it into said bath, and regulating the flow of both gas and steam to control the proportion of the non condensable gas to the steam prior to entry of the mixture into the liquid bath to retard the rate of condensation of the steam in order to obtain the desired agitation and temperature of the bath.

Grinding Wheel Mounting

U. S. Pat. 2,388,697. R. H. Lombard, assignor to Norton Co., Nov. 13, 1945. A grinding wheel mounting comprising a rotatable grinding wheel support having clamping members, and a grinding wheel having against a face thereof a mat element of woven glass fibres presented to one of said clamping members for compression of its springy fibres to thereby transmit and substantially yieldingly distribute throughout said face of the grinding wheel the clamping pressure exerted by the clamping member.

Plating Rack

U. S. Pat. 2,389,904. F. W. Hampson, assignor to Plating Processes Corp., Nov. 27, 1945. An electrode rack for suspending a batch of separated articles in an electrolytic bath comprising in combination a base



block of insulating material having thereon a plurality of base mountings each adapted to receive an article to be treated in said bath, a current-carrying top rail, tie bolts for connecting said top rail to said base block, sleeves of insulating material on said tie bolts, an intermediate block of insulating material carried on said tie bolts below said top rail, a plurality of current-carrying electrode studs carried in said intermediate block for relative vertical movement therein, each of said studs being arranged in vertical alignment with a corresponding base mounting and having its lower end adapted to engage the upper end of an article positioned on said corresponding base mounting for current connection therewith, and means on said tie bolts for vertically adjusting the said top rail to bring the same to bear against the upper ends of said several electrode studs in said carrier member for clamping the articles in position between the lower ends of said electrode studs and said base mountings.

Vitreous Enameling

U. S. Pat. 2,388,723. R. S. Cobb and B. Moore, assignors to The Moore Enameling & Mfg. Co., Nov. 13, 1945. The method of coating a steel cooking utensil comprises dipping the utensil in enamel apply a uniform coat on the interior and terior surfaces thereof, wiping the from the exterior bottom surface of utensil, heating the utensil to dry enamel and then scraping the exterior tom surface to eliminate scale and enamel particles, applying a copper sul coating solution to said surface by me of a sponge and passing the utensil thro an oven which will vitrify the enamel form a copper oxide layer, which laye then fused to said bottom surface.

Soap Composition

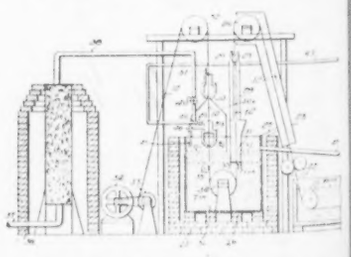
U. S. Pat. 2,388,767. L. Safrin, assig to Wilson & Co., Nov. 13, 1945. A composition comprising essentially an metal soap of a tallow soap stock and amounts of hydrogenated rosin and a p fied, substantially salt-free alkali sulf of a mixture of hydrocarbons having a p dominant portion of straight chain satura aliphatic hydrocarbons of 12 to 14 car atoms in the molecules, the amount of sulfonate varying from about ½ to 1 by weight and the said rosin from abou to 5% by weight.

Plating Baths

U. S. Pat. 2,389,135. H. Brown, assig to The Udylite Corp., Nov. 20, 1945. a process for electrodepositing metals, step which comprises electrolyzing an aq ous acid solution of a salt of the metal be deposited and a minor proportion of soluble sulpho-fatty acid ester of a mixt of alcohols containing predominantly fr 12 to 14 carbon atoms, the sulpho-fatty a radical containing from 2 to 4 carbon atom the metal to be deposited being selec from the group consisting of nickel, cob iron, zinc cadmium, copper, and antimony.

Hot Tinning Strip

U. S. Pat. 2,390,007. C. W. Sherman, signor of 1/3 to Dominion Foundries Steel, Ltd. and 1/3 to C. W. Sherm (Canada), Nov. 27, 1945. In an apparat for producing plated metal, means to h



a long length of base metal, means to pa the metal through cleaning means in prepa ation for plating, a flux bath, means to pa the metal through the flux bath, a coat bath, means to pass the metal from the fl bath directly through the coating bath, oil bath resting on top of the coating ba means to pass the metal from the coat bath through the oil bath, uniform pressu

Cowles
KW
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BRASS CLEANER
• A new outstanding COWLES CLEANER for non-tarnishing cleaning of polished and unpolished brass, copper and bronze in still tanks with or without electric current—also in all types of washing machine equipment. Cowles K W does not attack the metal. It is fast, efficient and economical. Immediate shipment from warehouse stocks.
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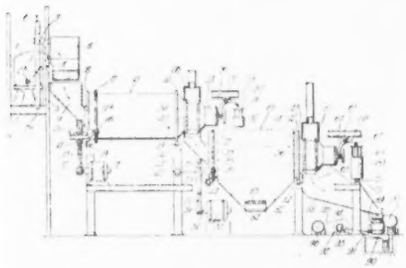
spray means, means to pass the metal through the spray means to uniformly remove excess coating and the oil, and means to dry the coated metal in preparation for storage.

Nail Cleaning Machine

U. S. Pat. 2,390,011. W. Thompson, assignor to American Steel and Wire Co. of



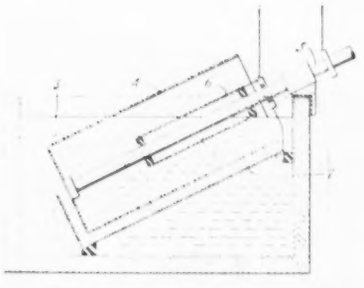
N. J., Nov. 27, 1945. Apparatus for cleaning nails comprising a rotary cleaning cylinder having helical fins therein, means for feeding a batch of nails and a cleansing agent into said cylinder, flanged scoops located in the cylinder in endwise abutting relation to said fins, a head at the outlet end of the cylinder having a converging annular wall, said scoops extending along said wall and the latter being adapted to receive said nails and cleansing agent dumped from said scoops as the cylinder rotates and to reverse the direction of travel thereof whereby the forwardly falling mass from the scoops is caused to cascade over the rearwardly falling mass sliding down said converging wall to thus cause a vigorous scouring interaction to take place between the nails and the cleansing agent.

Passivating Stainless Steel

U. S. Pat. 2,390,402. H. H. Uhlig, assignor to General Electric Co., Dec. 4, 1945. The method of improving the appearance and resistance to corrosion of stainless steel containing about 18 percent chromium and about 8 percent nickel which comprises immersing said steel, after first being pickled, in an aqueous solution of hydrochloric acid having a normality of from 6 to 9 and containing less than one percent quinolin ethiodide.

Electropolishing Barrel

U. S. Pat. 2,390,282. S. Tour and A. E. Howe, assignors, by mesne assignments, to



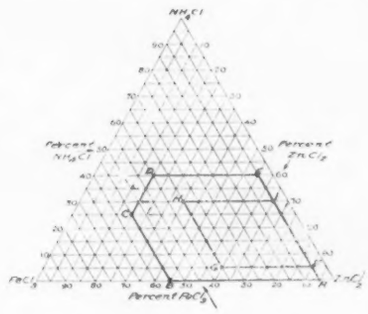
said Tour, Dec. 4, 1945. In an anodic electrolytic treatment of the class consisting of electropickling and electropolishing of metal articles in an electropolishing sulphuric acid-hydrofluoric acid-water electrolyte, the steps of immersing in said electrolyte a barrel electrode of copper, bringing the metal articles into contact with the inside surfaces of the barrel, making the barrel the anode while passing a current through the barrel, articles and electrolyte at a voltage and current density effective in said electrolytic treatment and under conditions which passivate the barrel with respect to the passage of current, and rotating the barrel to produce relative movement and mechanical contact between the articles and barrel to establish electrical contact between the barrel and the articles.

Alkaline Cleaner

U. S. Pat. 2,390,406. W. F. Wegst, R. McNabney and L. R. Bacon, assignors to Wyandotte Chemicals Corp., Dec. 4, 1945. A composition of matter comprising a solid alkaline compound from the group consisting of the alkaline-reacting alkali hydroxides, -phosphates, -carbonates and -silicates admixed with an amount of a member of the group consisting of dimethoxy tetraethylene glycol, diethylene glycol dimethyl ether and dioxane, said amount being not below 0.5% by weight but not above the quantity which would result in liquid separation by drainage.

Hot Dipping Lead

U. S. Pat. 2,390,440. E. J. Kalil, assignor



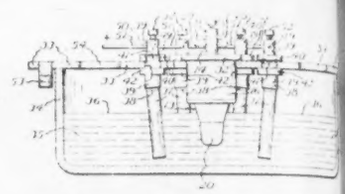
to The International Nickel Co., Inc., Dec. 4, 1945. The method of lead coating articles made of nickel and nickel alloys without cleaning and removal of the hot rolled oxide surface, comprising pretreating the uncleaned articles in a molten flux bath containing about 8% to 35% of iron salt from the group consisting of ferric chloride and ferric fluoride and 35% to 90% zinc chloride, the recited iron and zinc compounds constituting not less than 60% of the total composition of the flux, said bath being heated to a temperature range of between 670° to 700° F., thereafter immersing the pretreated articles in molten lead, and withdrawing the articles with a firmly adhering coating of lead covering the same.

Zinc Plating

U. S. Pat. 2,392,075. R. M. Wick, assignor to Bethlehem Steel Co., Jan. 1, 1946. In a process for the electrodeposition of zinc, the steps of electrolyzing a zinc containing solution having a sulphuric acid content from 150 to 300 grams per liter and a zinc content from 50 grams to 100 grams per liter at a current density at least as great as 750 amperes per square foot of cathode surface while maintaining such solution at a temperature at least as high as 49° C.

Plating Process

U. S. Pat. 2,391,206. E. van der P
signor to Norton Corp., Dec. 18, 19
apparatus for fixing abrasive granules
backing electrolytically, a porous rec
adapted to be suspended in an electro
bath, a cathode member extending int
porous receptacle and having means fo



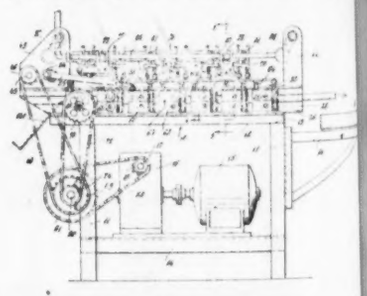
porting a metal blank within said rec
in spaced relation to the wall of the
tacle, means for introducing abrasive
ules into said porous receptacle and
the portion of said blank to which
desired to affix the abrasive granules,
means supported in said porous rec
for shielding another portion of said
from contact with said granules, and
the plating action of an electroplating
in which said porous receptacle is susp

Pickling Inhibitor

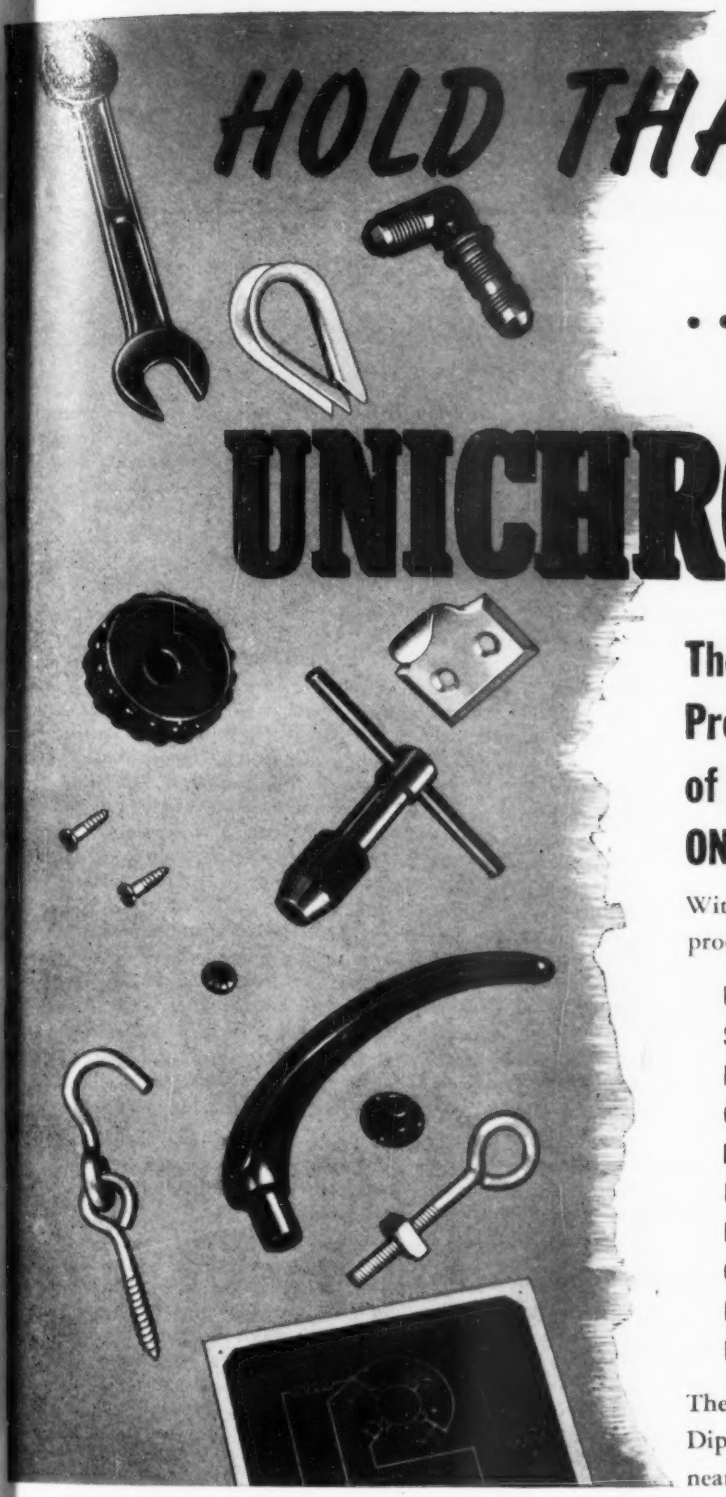
U. S. Pat. 2,392,404. H. L. Peters
signor to Lotte Chem. Co., Inc., J
1946. An inhibitor for substantially
venting the dissolution of iron or st
dilute solutions of non-oxidizing mineral
comprising a minor proportion by weig
di ortho xenyl thiourea and a major
portion by weight of sodium sulfate.

Cleaning Etched Plates

U. S. Pat. 2,392,176. J. Nowatius, as
to Etched Products Corp., Jan. 1, 194
machine for treating etched plates to re
matter adhering to the surface of the
etched portions thereof, in a final pha
the production of such plates, compri
means for conveying a plate through
machine in a continuous movement, a
ality of scrapers disposed at spaced int
along the machine transversely thereof,
scrapers being movable in opposite d
tions longitudinally of the machine b
two extreme inoperative positions al
curved path to successively contact
traverse the surface of the unetched por
of said plate, in the advancement of
latter through the machine, in a pred



mined zone of their travel to progressi
remove the matter adhering to said surf
and means functioning simultaneously w
the plate-conveying means for continuo
actuating said scrapers during operation
the machine.



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- **Low cost solutions.**

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☆**UNICHROME STOP-OFF LACQUERS AND COMPOUNDS**

☆**UNICHROME Clear and Pigmented LACQUERS**

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SHOP PROBLEMS

PLATING AND FINISH
POLISHING—BUFFI
CLEANING — PICKLI
HOT DIP FINISH

METAL FINISHING publishes, each month, a portion of the inquiries answered as a service to subscribers. If any reader disagrees with the answers or knows of better or more information on the problem discussed, the information will be gratefully received and the sender's name will be kept confidential, if desired.

Finishing Tools

Question: We have a finishing problem with which we hope you can help us.

Our tools—carbide tipped cutting tools—are now being finished by the sand blast method with a subsequent oiling for rust prevention. But we know that this is not an attractive or adequate finish for our tools, which are precision tools. They are sold for a much higher price than ordinary metal cutting tools. Therefore, we must have a durable and attractive permanent finish on the tools which we sell.

We thought that perhaps some sort of anodizing operation might be the answer.

J. W. G.

Answer: We do not know of any anodizing process which would prevent rusting but would suggest the shanks of these tools be cadmium plated.

Gold Plating

Question: I am unable to obtain a two minute acid test to stand up on gold plating. I would indeed appreciate information regarding formulas and conditions for a gold plate on new copper that is not attacked by a 50% nitric acid solution.

J. M.

Answer: We would suggest the following:

41% Potassium gold cyanide	1 oz/gal.
Potassium cyanide	1 "
Dipotassium phosphate	1 "
Potassium sulfite	¼ "

Temp. 160°F.

Burring

Question: We have experienced pitting when burring by tumbling parts with alundum chips and 2 ounces of cleaner per gallon of water. Parts are tumbled in a tilting barrel which does allow the work to be instantaneously exposed to the air during tumbling. How can this be eliminated?

J. D. M.

Answer: In our opinion, alundum chips are too hard for burring and are probably the cause of your pitting.

We would suggest that you obtain one of the proprietary burring compounds which have the abrasives attached to a relatively soft base.

Brass Plating

Question: I am supervising a plating and polishing plant on costume jewelry and would like some information.

I made up a brass solution of 60 gals., according to your formula in *Plating and Finishing Guidebook* 1943, Page 8. The first time I made up this solution, eight months ago, I had some green copper cyanide that I used, and I got a first class brass plate from this formula.

I find I need a new brass solution as this one is very dirty and I have no way of filtering it. I made a 60 gal. solution of brass from the same formula, the only difference was I used white copper cyanide, but the plating came out copper color, so I added another 15 lbs. sodium carbonate, 1 lb. zinc cyanide, and about 1 pint ammonia. I am getting a nice brass, but it does not seem as heavy as before, and I have to use more current. Can you tell me if it is the white copper that causes this trouble and how I can get a heavier plate with less current.

E. W.

Answer: We would suggest that you have this solution analyzed since the constituents may not be in the correct proportions.

Coating Aluminum

Question: In your issue of November 1943, you give a formula for tin coating aluminum by immersion. Please inform us if the adhesion of this tin coating is sufficient to be used as a base for further plating.

L. R. S.

Answer: We would suggest that a zincate dip be used for this purpose rather than the stannate dip as excellent adhesion is obtained with the former. The zincate solution is patented and salts are obtainable from the Enthone Company, 442 Elm Street, New Haven, Conn.

Removing Scale

Question: What is a good pickle for removing scale from white metal and Britannia? It is hard to buff off.

R. F.

Answer: We know of no good pickle for removing scale from old white metal. The usual procedure is to sand bob this type of metal.

Plating Pot Metal

Question: I should appreciate any in
mation you can give me on the follo
question: How do you remove chem
electrical welding flux from honeycomb w
without removing too much metal?

We are also having trouble with pl
pot metal material without blisters. S
times the work comes out nicely and
times it is full of blisters. We have
using a basis plate of copper, brass, n
die cast nickel and cadmium but by
method the results are the same—bli
We have tried cutting the base metal
butler finish, then electroclean cathodi
then rinse in cold water (cathodic cle
time about a half minute), then dip in
per cent acetic acid dip, rinse, cyanide
with current (cathodic), rinse, then
copper. Result, blisters. We have tried
above process in other baths and get the
results. We have also tried wet scratch b
and pumice for cleaning the base m
then scrubbing with lime, rinsing, cya
dip, and plating in all of the above b
We have also tried using a cleaner for
per, brass, pewter metals, thinking
maybe our base metal was not clean.
our results have been the same by any me
that we have tried. We have tried usin
slight amount of current up to a h
current in the plating baths with no be
results.

C. R. S.

Answer: We would suggest that you
municate with the manufacturer of the
for information on methods of removal.

Pot metal is of a very variable composi
and is ordinarily very difficult to cl
After polishing, the metal should be clea
with solvent and wiped dry. It should
be given a mild alkaline cleaning for a
seconds with direct current, rinsed, give
dip in 20% by volume hydrochloric a
rinsed and copper plated.

Eliminating Dull Finish

Question: We have a problem and w
appreciate your advice; herewith enclose
a lieutenant bar which has a 30 second
posit of gold and stands a 2 minute acid t
(which is government specification) on sa
The article is highly polished before it g
into the gold bath; but it comes out d
like the enclosed.

L. L.

Answer: The condition is probably due
improper operation of the solution.
would suggest that you operate with hig
metal and cyanide contents, increase
temperature and lower the current densi
A small amount of sodium sulfite may
added from time to time as a purifier.

I'll be riding that drum into your plant!

Just suppose you've given a Diversey D-Man a trial order. Usually on the very day that Diversey drum or barrel rolls into your plant, you'll find the Diversey D-Man on the job, decked in overalls with shirt sleeves rolled up.

Your D-Man is not merely an order-taker. The most important part of his job is to make certain that your plant men use that Diversey product properly and to best advantage.

A Trained Specialist!

It takes "know-how" to deliver service like that . . . know-how that can be acquired only through specialized training plus practical experience. Before a Diversey D-Man is placed in the field he is given intensive classroom instruction. During his first week or so in the field he is accompanied by an experienced D-Man, while throughout the following months his training continues.

Service That Delivers Results!

Sure it costs money to put a D-Man in your plant for a couple of hours or days just to service a drum of material . . . but it pays in the long run for you as well as us. The Diversey D-Man delivers *results* . . . not merely so many pounds of material. That's why more and more plants everywhere are looking to Diversey for *all* their metal finishing requirements. Metal Industries Dept., THE DIVERSEY CORPORATION, 53 W. Jackson Blvd., Chicago 4, Ill.

DIVERSEY

Surface Preparation Service

FOR THE METAL INDUSTRIES

DIVERSEY PRODUCTS FOR CLEANING STEEL

Diversey DC-22—A vigorous, heavy duty cleaner that quickly and completely removes dirt, oil and grease from iron and steel parts.

Diversey DC-44—A medium duty cleaner that readily removes oil and grease.

Diversey DC-16—A triple duty product used (1) as a solvent for removing oily and greasy contaminations containing solids; (2) as an emulsion cleaner for use in automatic washing machines; (3) as a light-duty rust-proofing compound between fabricating operations.

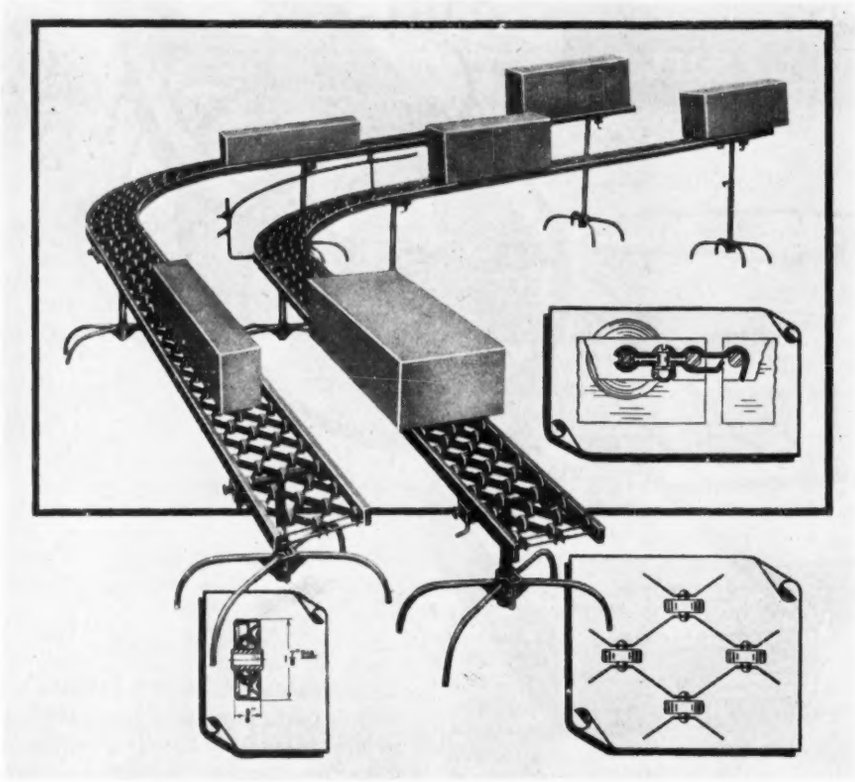
Diversey Everite—A powerful solvent for removing heat scale and rust quickly and completely without harming the sound metal.

Diversey DC-12—An electro-cleaner that minimizes danger of hydrogen explosions by developing limited foam blanket. Safely removes stubborn smut and dirt.

Diversey Dilac—Microscopically etches steel surfaces in preparation for painting. Imparts a rust inhibiting coating. Leaves an ideal surface for receiving and holding an organic finish.

NEW EQUIPMENT AND SUPPLIES

NEW PROCESSES, MATERIALS AND EQUIPMENT FOR THE METAL INDUSTRY



Materials Handling Equipment

Newest innovation in the Market Forge Company's line of standardized materials handling equipment is the Load-Veyor.

There are many new and exclusive features which make the Load-Veyor outstanding in the materials handling equipment field. Load-Veyors are reversible so that either side may be used. One side may be used for the moving of large packages, while the reverse side is used for the convveyance of small packages, in which case the side members act as guide rails. Ribbons of steel support the ball bearing rollers on both sides in rigid grid-like construction.

It is said to be the lightest weight steel conveyor available—each ten-foot length weighs only 58 lbs., and one man can easily carry two sections. Removable connectors or couplings are available, thus simplifying the assembly of the conveyor unit.

The rollers are 1⅜" in diameter by ⅝" wide. They are furnished with hardened inner and outer ball-bearing raceways. The Parkerizing and oiling treating process protects the rollers from corrosion, and insures maximum efficiency. Rollers are tightly riveted to the grid, eliminating any chance of their becoming loosened even with hard usage. In each ten-foot section there are 103 rollers, so that the section begins and ends with three rollers in line.

Load-Veyors are also available in aluminum or stainless steel. A complete line of accessories will also be provided, such as 90° curve, 45° curve guard rails, adjustable stands, portable stands, a reversible stand, package retarder and package stop. Portable stands are provided with 3" caster wheels, with or without brakes.

Another interesting feature is the fact that the stands may be attached in any position along the length of the conveyor, so that sufficient support may be furnished to accommodate any practical load. When suitably supported, a ten-foot conveyor section will carry a distributed load of 1000 lbs. Further information may be obtained by writing to Market Forge Co., Dept. MF, Everett, Mass.

Enamel Stripper

Enthone Company, Dept. MF, 442 Elm St., New Haven, Conn., have announced the development of a new stripper called "Enthone Enamel Stripper S-300" for removal of many types of organic coatings. Synthetic enamels such as alkyds, melamine, and urea formaldehyde coatings are readily stripped with this stripper. The product can be used for stripping of these and other coatings oper full strength at room temperature, and is also a powerful stripper when used dil with water and the mixture heated in temperature range of 150-180° F.

Enamels are stated to be removed cle by a wrinkling action leaving the work cl and bright. There is no attack upon base metal and such active metals as al num, zinc, and tin are unharmed. P phate coatings and anodized coatings also unharmed by this stripper.

Burring Machine

Designed to provide mass production ring by increasing output as much as percent over hand labor, the new G "Burr-Rite" machine features double

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triple compartments which can perform two operations, polishing and burring, simultaneously.

Maintaining the high standards of other burring machines manufactured by The Globe Stamping Division, Dept. MF, Hupp Motor Car Corp., Cleveland, Ohio, the new, larger model finishes aluminum, brass and die castings at a lower cost. The handling of parts has been simplified by the installation of a new hoist pan. Large lightweight doors make loading and unloading easier. To maintain continued mass production the large compartments can be relined with tough, hard maple liners without removing the shell.

The new burring machine is available in three models. The single compartment model has a cubical content of 18.4 feet. In the double compartment model, each compartment has a capacity of 9 cubic feet and in the triple compartment model, each compartment has a 5.1 cubic feet capacity. Despite the increased production of the new machine it occupies about the same amount of floor space as smaller models.

Fireye Photoelectric Flame-Failure Safeguard

Fireye Flame-Failure Safeguard Type F18T is designed to provide explosion protection for all industrial and commercial oil and pulverized coal burners. Fireye is photoelectric, and therefore actually sees flame. When flame fails, Fireye instantly cuts off fuel and sounds an alarm. Unlike thermal controls, Fireye is actuated not by the effect of flame failure but by the flame itself. Action is positive, instantaneous, electronic.

Fireye Type F18T has been designed to meet the requirements of the industrial user as well as the burner manufacturer. It consists of a phototube and amplifying system, housed in a dust-tight aluminum case. The entire control is mounted directly on the furnace wall and is aligned in a manner which permits the photoelectric cell to observe the flame through a 2" pipe connection which serves as both a sighting tube and a support for the equipment.

The simplified installation is made possible by the unique design features of the control. A clear pyrex filter keeps the equipment dust-tight and is mounted on a hinged shutter which permits it to be cleaned without shutdown. A heat-absorbing filter in the lens system as well as an efficient baffle system protects Fireye from all radiated heat. The specially designed Fireye phototube permits operation at high ambient temperature.

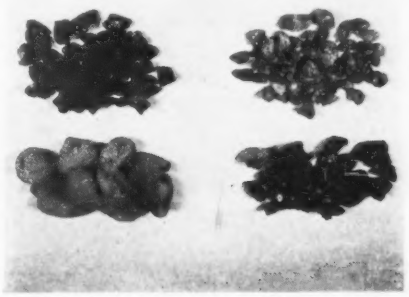
Other features include a pilot light which can be viewed through an angle of 180°, and a time delay element which prevents the relay from dropping out during purely transient flame disturbances.

Specifications:

Supply: 115-230 volts 50/60 cycle a.c.
Power Consumption: 10 watts.
Output: Single-pole, single-throw relay.
Contact: 5 amperes or ½ hp at 230 volts a.c.
Operating Range: The front of the control should be located within five feet of the flame which it is to monitor.
Weight: 12½ lbs.
Ambient Temperature Range: 32°-150° F.

Tumbling Abrasive

Alundum Abrasive is now being marketed by Norton Company, Dept. MF, Worcester, Mass., in a special form for use for wet tumbling. It is a hard, heavy, tough and fast cutting aluminum oxide product that is proving excellent for cleaning, burring, finishing and the development of radii on a wide variety of metal parts.



Alundum Abrasive is available in four size groups, namely, ¼-½", ½-¾", ¾-1", and 1-1½" diameters, either untumbled or tumbled (sharp corners rounded). The accompanying illustration shows the smallest and largest sizes in tumbled form and the other two sizes untumbled. The extreme hardness of Alundum Abrasive provides continuous fast cutting action without glazing over as is often the case with other tumbling materials.

Normally used with water and a cleaner, Alundum Abrasive for tumbling has proved to be superior to other methods of burring and finishing. It has eliminated the variable results obtained by the usual manual bench operations. Radii on gears, for instance, have been held to exact blueprint specifications on lot after lot while costs were considerably reduced. Microinch finish can be easily maintained or improved. For example, precision parts are being consistently held to a one microinch finish by tumbling with Alundum Abrasive. Finishes with a higher micro reading that one, can be improved.

Solvent Cleaner

The Optimus Detergents Co., Dept. MF, 126 Church St., Matawan, N. J., manufacturers of industrial metal cleaners, has introduced a new solvent cleaner, Optimus Solvent No. 2. The product is quick and effective in removing grease, oil, carbon, grit and miscellaneous shop dirt from metal parts.

Originally developed for cleaning of parts to facilitate inspection, this new material is finding wide usage in other industrial cleaning operations. Proper solvent blending in the making of this new product provides more versatility in the selective attacking of greases and dirts to be removed.

Though compounded to give maximum cleaning strength in operation, Optimus Solvent No. 2 will not harm metal surfaces or operator's hands. Its odor is clean and entirely free of toxic and irritating fumes.

Completely miscible, this product will combine in kerosene or other hydro-carbon diluent, and remove soil from work by solvent cleaning action. In spray-type washing machine operations, it may be diluted at a ratio of 1 to 7 parts in fuel oil. Pressure of 20 lbs. has been found sufficient. A water rinse emulsifies the solvent and kerosene mixtures readily rendering physically clean surfaces suitable for further processing. Properly diluted with water, it is also applicable as a pre-soak prior to electrocleaning to remove tripoli, rouge and similar buffing compounds.

Available in 15 and 55 gal. drums. Samples suitable for testing available on request.

Rubber Covered Tank Plug

Perma-plug is the name of a new device for stopping tank leaks quickly.

The flange part which fits on the inside of tank is rubber covered and when leaks occur a hole is drilled through the tank and the Perma-plug is inserted from the inside and held in place by the stud which goes through the wall of the tank and is fastened by a lock washer and nut on the outside.

Repairs can be made in 15 minutes thus avoiding costly shut-downs. Perma-plugs are covered with rubber and will outlast the tank.

Perma-Line Rubber Products Corp., Dept. MF, 1840 N. Damen, Chicago 47, Ill., is the manufacturer.

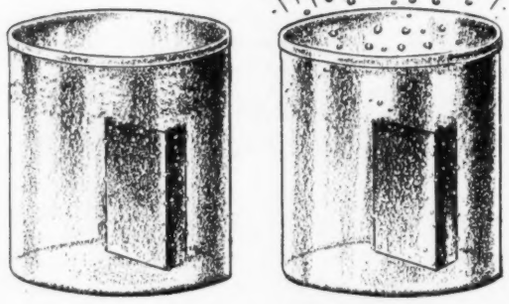
Carboy Truck

Palmer-Shile Co., Dept. MF, 7124 West Jefferson Ave., Detroit 17, Mich., has recently designed an all steel truck which is especially suited for easy loading and con-

TROXIDE

for

Safe, Effective, Economical **"BRIGHT-DIPPING"**



TROXIDE CONVENTIONAL METHOD

- **Eliminates mixing-hazards**
- **No dangerous fumes . . . personnel and equipment protected**
- **No "splash-burns"**
- **Easily, safely stored**
- **Formulae developed to fit specific requirements**

TROXIDE . . . a bright, new name in the "bright-dipping" field . . . offers industry an amazing degree of safety . . . plus an efficiency that meets *specific* job-requirements. A scientifically developed compound of dry, inert chemicals, TROXIDE becomes active *only* when dissolved in water . . . and can be handled easily and safely.

When TROXIDE Bright-Dip Formulae are used, the hazards commonly present in the conventional bright-dip formula are eliminated . . . no dangerous, corrosive fumes . . . no "splash-burns" from accidental splashing. The solutions are easy to prepare . . . and economical, too. In addition, TROXIDE Bright-Dip Formulae will give you brilliant finishes.

SAFE TO STORE AND HANDLE

Its formulae tried and proved in plants all over the country, TROXIDE will answer *your* bright-dip problem . . . safely, efficiently, economically.

Troxide Bright-Dip Formulae cost you nothing. What is your problem? Our laboratory is at your disposal.

TROXIDE

SUPPLIERS—*South, Midwest & West:*
Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa.
***East:* Safety & Maintenance Co., Inc., 601 W. 26th St., New York 1, N. Y.**

venient handling of carboys. To load truck simply roll the truck up against carboy, drop gripping yoke over the top illustrated, and loading becomes automatic by pulling back on the truck handles. Fingered steel studs on the truck frame hold load in place. To unload tip the truck forward and release gripping yoke.

Further information may be obtained by writing to the company at the above address.

Baking Enamel

A high-grade baking enamel, unusually fast drying and almost indestructible, has been developed by the H. V. Walker Co., Dept. MF, Elizabeth, N. J. This was announced by George W. Lonergan, president of the company.

Called "Porciflex," this new paint, when applied to metal gives a flexible porcelain-like finish which has a high resistance to acids, alkalis, oils and greases.

Porciflex was devevloped to meet the need for faster production in all industries using organic finishes on metal. Wartime emergency called for more speed in the finishing room and experiments were conducted in the Walker laboratories to produce enamels which would solve this problem.

Previous materials were baked at temperatures ranging from 275 to 300 degrees for one-half to one hour. This kept workers waiting for drying ovens to be emptied and held up the entire manufacturing process.

Applied by spray, roller-coating machine or dip, this enamel is baked at schedules from one minute at 450 degrees for sheet steel to 15 minutes at 275 degrees for other types of work. It is also well-adapted to infra-red baking.

This fast drying quality of the enamel enables a finishing department to spray continuously and thus step up daily output by an appreciable percentage.

Available in clear, black, white and colors, it makes an attractive appearance wherever used. White Porciflex has a minimum tendency to yellow with age, an important factor in household fixtures.

Several large manufacturers of costume jewelry are now using Porciflex in their enamel work. A new spray unit has been especially designed for this type of operation which cuts production time to a minimum.

Porciflex has an infinite adaptability due to its unusually flexible make-up. It will not crack or flake when struck and will not peel off under normal conditions.

New Surface Preparation

The Amercoat Division of the American Pipe and Construction Co., Dept. MF, P. O. Box 3428—Terminal Annex, Los Angeles 54, Calif., announces two new products supplementary to their line of Amercoat Plastic Coatings.

Amercoat No. 59, a surface preparation for zinc, is a treatment for galvanized metal surfaces prior to application of a protective coating.

Amercoat No. 60, a surface preparation

for copper and brass, is a similar treatment for these metals.

These surface treatment solutions are for use where shot or sandblasting are impractical. The resulting adhesion of the protective coating is excellent where applied over a zinc, copper or brass surface properly prepared by these methods.

Printed application instructions are available upon request to the manufacturer.

New Container

A handy, new container for a wide range of shop uses has been announced by the Kindt-Collins Co., Dept. MF, 12651 Elmwood Ave., Cleveland 11, Ohio. These are sturdy, handsome containers of heavy aluminum, built to stand plenty of abuse in daily shop service. A feature of the can is the crossbar support inside the can, which can be readily removed for cleaning. This serves both as a wiping bar for surplus material on the brush, and as a unit upon which to hang the brush when it is not in use. The cone-shaped top fits snugly over the can, covering both the brush and the contents, preventing hardening and evaporation. The aluminum will not stain or discolor the contents of the can.

Anti-Vibration Unit

Robinson Aviation, Inc., has announced that a new type of anti-vibration mounting unit, for the protection of delicate equipment of all kinds, is now in production and available for many industrial applications.

This mount, the Robinson Vibrashock unit, is remarkably effective and, it is believed, offers for the first time a complete virbration absorption unit ready for installation and use. A damping system, a snubbing system

and electrical bonding are integral and are contained in a neat aluminum housing of standard dimensions.

Actual performance tests, it is claimed, have shown that the new Vibrashock Unit averages better than 90 per cent absorption of vertical and lateral vibrations over a wide range of frequencies. Experience has shown that this high absorption results in tremendously increased service life and lower maintenance costs.

In the Vibrashock Unit, a radical departure has been made in the carrying of the principal load by a stainless steel spring of special design with three-way freedom movement and built-in, three-way limiting snubbers furnishing a resilient stop to limit heavy shock loads. By elimination of rubber or synthetic for load carrying, the new mount avoids permanent set and vulnerability to cold, heat and humidity.

These units, manufactured by Robinson Aviation, Inc., Dept. MF, Teterboro, N. J., are available in three standard sizes and a wide range of load capacities to provide efficient, economical anti-vibration mounting and lengthened service life for: presses, automotive machines, compressors, motors, generators, sewing machines, fans, blowers, counting and sorting machines, soundproofing walls and ceilings, and many other installations.

Proportional Current Input Controller

The Bristol Co., Dept. MF, Waterbury 91, Conn., has recently developed a new electric type controller which combines a proportional current input controller and a recorder in one case. Designed to provide extremely accurate control of electrically heated furnaces and ovens, this new instrument provides on-and-off type control with the advantages of proportioning control.

A rotating cam interrupts the flow of current to the heating coil or coils the duration of which is determined by the departure of the controlled temperature from the control point.

Complete details are given in Bulletin PB1226 now available from The Bristol Company.

Mirror-Finish—Water White

MICCROLAC

A NEW HIGH-LUSTER COATING WITHOUT EQUAL

Protects and Beautifies All Metal Finishes

Mirror-Finish MICCROLAC is a totally new product—a high-luster protective finish that will meet your specific needs more successfully than any similar product you have ever used.

MICCROLAC has no equal as a protective coating for silver plated ornaments, trophies, lighting fixtures, and all decorative metal finishes — also polished brass or brass plated products, interior and exterior hardware, metal mouldings, automobile hardware and exposed metal surfaces of scientific instruments.

Try MICCROLAC without cost. Upon request a trial quantity will be sent free—without obligation.

MICCROLAC Has These Outstanding Characteristics

- Dries to a very high lustre.
- Provides adhesion which cannot be matched by any similar material.
- Extremely flexible—resists bending and vibration.
- Has unequaled abrasion resistance, does not chip or crack.
- Very fast drying. Dries to handle in few minutes.
- Offers excellent resistance to sulphur dioxide, sunlight, moisture (preventing rust), oil, grease, gasoline, and all commonly known chemical fumes. Also salt spray, acids and alkalies.
- Is water-white—eliminates color tinge.
- Does not blush even in humid weather.
- Can be sprayed or dipped, on small parts can be applied by brush.

COMING!

Another MICCRO first! A rack coating that will definitely meet the requirements of every plating cycle. Look for it!

Write for Bulletin

MICCRO Products

Manufactured and Developed by Experienced Platers

MICHIGAN CHROME and CHEMICAL COMPANY

6340 East Jefferson Avenue • Detroit 7, Michigan

Du-Lite

SUCCEEDS WHERE OTHERS FAIL

Try Du-Lite's Black Chemifinish for uniform, trouble free finishing of steel parts. Du-Lite has justified its use after others have failed. Why? Because the efficiency and the easy workability of the Du-Lite Process, together with the toughness and the durability of its resultant finish, have been found most satisfactory again and again for all kinds of steel parts in regular production.

Our Field Engineer, located in your industrial area, will be glad to talk with you about your finishing problems. You can rely upon his advice and judgment. He is prepared to recommend needed processing equipment, supervise the installation, and train your men to operate it successfully.

Call or write Du-Lite at Middletown for service or further information.

DU-LITE
The Dependable
Black Chemifinish
for Steel Parts

DU-LITE CHEMICAL CORP.
DEPT. S, MIDDLETOWN, CONN.

Business Items

G. R. Bryant, formerly a sales engineer in the Buffalo and New York City sales offices of *General Electric Co.*, has become associated with *Robert L. Orth* as sales engineer in the Detroit Office.

John N. Harper has been appointed sales representative with headquarters in Pittsburgh, Pa. Mr. Harper has operated as a manufacturer's agent in Pittsburgh for many years with broad experience in steel products and finishing materials.

E. Reed Burns Mfg. Corp., with headquarters at 40 Withers St., Brooklyn 11, N. Y., announces the appointment as their representatives in the Pittsburgh district of the Terminal Engineering & Supply Co., 47 Terminal Way, Pittsburgh 19, Pa.

Terminal Engineering & Supply Co. is an organization of men with specialized experience in all phases of the abrasive field, and they will be able adequately to present the Reed Burns line of polishing compounds, buffs, wheels and kindred supplies.

Frank J. Schulz has resigned his position as superintendent of *Anderson & Sons*, Westfield, Mass., and has opened a contract plating plant known as the *National Metal Finishing Co.*, 41A Mill St., Springfield, Mass.

Mr. Schulz entered the electroplating field in 1925 with the *Chemical Treatment Co.* which is now *United Chromium, Inc.* He was connected with the industry in and about New York City until 1944 when he left these parts for a secret assignment which turned out to be the atomic bomb project at Oak Ridge, Tenn. Since returning north he has been with the Anderson firm.

Mr. Schulz is a member of the *Springfield Branch* of the *American Electroplaters' Society*.

F. S. Louie & Co., 178 Shakee R... Canton, China, is a company formed b... group of Chinese engineers who were ... cated at universities in the United St... This company is interested in acting as ... tributors of American made electroplat... equipment and supplies to the China mar...

Firms interested in having an agent... China are invited to communicate with ... company at the above address.

Mr. Joseph Mazia, formerly head of ... Protective Finishes Section of the Ordna... Research Laboratory at Frankford Arse... has been appointed metallurgist in ... Metal Surface Treatment Division of ... *American Chemical Paint Co.*, Ambler, ...

H. W. Surbrook has been appointed co... troller of *Detrex Corp.*, Detroit 27, Mi... manufacturers of industrial cleaning ...

H. W. Surbrook

chines and materials, and drycleaning equ... ment.

In announcing this advancement, ... *A. O. Thalacker*, vice-president and gener... manager, points to the excellent record ... Mr. Surbrook as head of the compan... accounting department during the war.

In addition to being a certified pub... accountant, Mr. Surbrook is a graduate ... the University of Michigan, and a mem... of the National Association of Cost Accou... ants and the National Office Manageme... Association. Prior to coming with Den... he specialized in industrial accounting wh... associated with the public accounting firm... of Parker-Elsholz, and Haskins and Sells.

Leslie Co., Lyndhurst, N. J., manufactur... of regulators and controllers announces th... appointment of the following agents t... handle industrial sales and services:

H. F. Eastman Co., Boston, Mass., Easter... Massachusetts;

Wilson Engr. and Sales Co., Clevelan... Ohio, North Central Ohio;

Modern Electric and Engineering Co... Inc., Fremont, Neb., Eastern Nebraska an... Western Iowa;

Mooney Engineering Co., Kansas City, M... Eastern Kansas and Western Missouri.

E. L. McIlhenny

Mr. E. L. McIlhenny, for the past eight years with the *Detrex Corporation* of Detroit, has left that organization to join the research and field service staff of *Ferro Enamel Corporation* of Cleveland. He will make his headquarters in that city.

Widely known for his work in the detergent and metals cleaning field, Mr. McIlhenny brings eighteen years' experience to the solving of such problems for Ferro's customers, an important part of the company's technical field service.

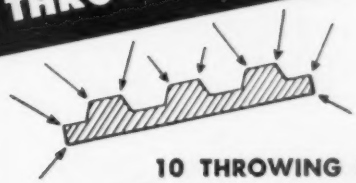
A graduate of Washburn College, Mr. McIlhenny took two years' postgraduate work in chemistry at the University of Minnesota before entering business. He is a member of the *American Ceramic Society* and the *American Electroplaters' Society*.

Mr. McIlhenny will reside at 1049 Allston Ave., Cleveland Heights, Ohio.

Paul Peckar, formerly assistant senior division engineer of the Reconstruction Finance Corp., has joined the engineering staff of *Tenney Engineering, Inc.*, 26 Avenue B, Newark 5, N. J., manufacturers of automatic temperature humidity and pressure control equipment.

Paul Peckar

Multi-Edge
LEAD ANODES
for Greater
THROWING POWER



10 THROWING EDGES
FOR GREATER EFFICIENCY

Two principal reasons account for the overwhelming preference given Republic Multi-Edge Lead Anodes by quality and cost-conscious platers everywhere.

FIRST: Ten throwing edges assure maximum throwing power—greater all around plating efficiency.

SECOND: The anode is homogeneously burned to the hook, assuring positive contact during the full life of the anode, and even wear over its entire length.

Republic Lead Anodes measure ½" thick by 3" wide, in any length. Hooks are supplied to exact specifications—knife or flat edge for round or rectangular rods, for normal or high solution levels. Each anode is stenciled for height of solution level.

Conforming anodes and anodes for specialized plating purposes available on order. Republic Multi-Edge Anodes may be ordered through your plating supply dealer, or write direct to:

REPUBLIC
LEAD EQUIPMENT CO.
7930 Jones Road, Cleveland, Ohio
A Unit of the U. S. Stoneware Co.

Mr. Peckar had had wide engineering and administrative experience with the War Department. Previously, he was also administrative supervising engineer of the Defense Plant Corp. program for defense plant equipment acquisition and construction.

As engineer with the Construction Estimating Division of the War Department, Mr. Peckar worked in conjunction with the Cantonment Housing Program for all the Army Camps in the United States.

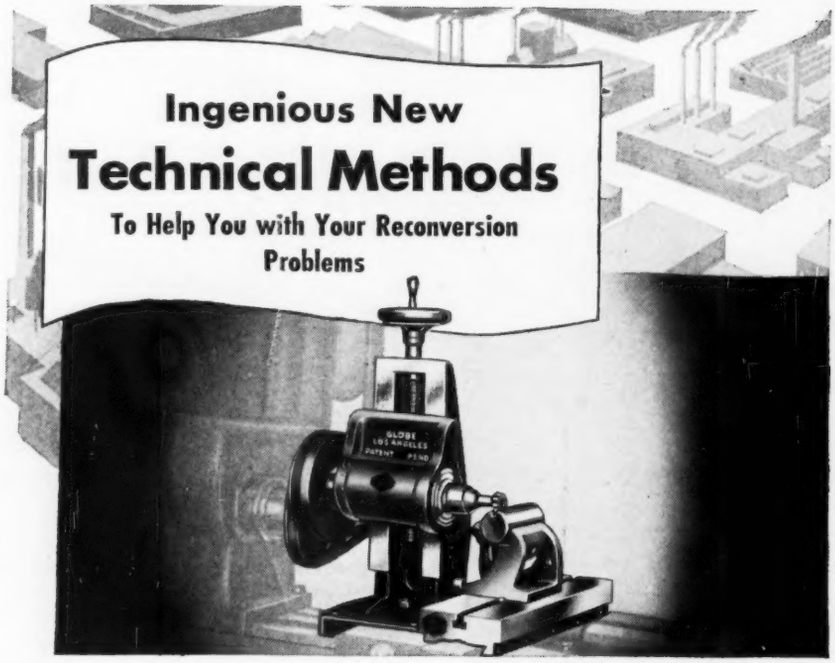
Calvin Verity, President of *Rustless Iron and Steel Corp.*, announced that at the meeting of stockholders held recently the agreement of merger of Rustless into *The American Rolling Mill Co.* was adopted by the favorable vote of 84.5 percent of the outstanding stock. The shareholders of The American Rolling Mill Co. had previously adopted the agreement of merger. It was proposed that the merger was to be effected after the close of business December 31st.

Charles G. Boone, superintendent of the *Pennsylvania Salt Mfg. Co.*, plant, Natrona, Pa., has announced his retirement after 21 years as head of Pennsalt's Natrona operations.

Mr. Boone, now 67, became superintendent of the Natrona plant on Jan. 15, 1925, three months after he joined Pennsalt in the Philadelphia headquarters.

A number of important sales territorial changes have been announced by *L. L. Andrus*, vice president in charge of sales of *American Foundry Equipment Co.*, 555 So. Byrkit St., Mishawaka, Ind.

A. H. Freeman has been appointed sales



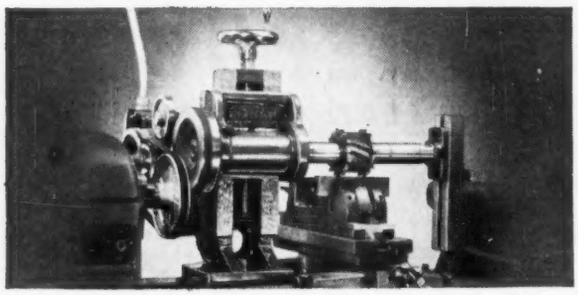
New Unit Makes Milling Machine Out of Lathe in 3 Minutes!

The Globe Miller, a unit quickly attached to a standard lathe, performs the same operations as a costly milling machine. Installed in 3 minutes or less, the Globe Miller operates almost identically to a standard milling machine. All controls are simple, highly accurate—and the miller is designed to utilize all speeds and feeds of the lathe.

It is accurate, durable and highly versatile. With minor adjustments and accessories, the miller will face castings; cut slots, keyways, and gears; perform slitting operations, etc. Quality materials and rugged construction enable it to stand the hardest use. It costs but a fraction as much as a standard miller. Its compact design makes storage possible underneath the lathe. Proved performance in wartime production, assures dependable service.

Performance has also proved that chewing gum helps you on the job—by seeming to make work go easier, time go faster. Today, you'll see good chewing gum on the market. But a shortage still exists. Wrigley's Spearmint Gum is taking this space for your information, and for now, we'd like to suggest that you use any good available brand. Remember: It's the chewing that's good for you.

You can get complete information from Globe Products Mfg. Co., 3380 Robertson Boulevard Los Angeles 34, California



AA-55

representative with headquarters in Milwaukee, Wis. Mr. Freeman was recently sales engineer in the Detroit office. He has been with the company continuously since 1918 in important manufacturing, service and sales positions.

Vernon S. Spears, who had served for several years in the Northern Indiana sales territory, has been named sales representative covering practically the entire state of Indiana. He had served in the sales department of the home office for many years prior to his appointment to the sales staff.

Charles E. Ludwig has been named sales representative in a newly created territory with headquarters in Buffalo, N. Y. He has been with the company for eleven years and prior to this apointment, was sales representative in the St. Louis, Mo., territory.

Donald E. Matthews has been appointed sales representative with headquarters in St. Louis, Mo. Mr. Matthews was formerly connected with *Soreng-Mannegold Co.*, Chicago, as works managers and sales engineer.

Joseph F. Underway, formerly field manager of *East Texas Electric Steel Co.*, Longview, Texas, has been appointed sales representative with headquarters in Houston, Texas. He has been associated with the foundry business for nearly 20 years in various positions.

Robert A. Campbell has been named Canadian Sales Engineer with headquarters in Toronto, Canada. The past three years he has been associated with *Salem Engineering, Canada, Ltd.*, as sales and design engineer. Prior to that, he was superintendent of the *Ammonium Nitrate Plant of Welland Chemical Works, Ltd.*, Niagara Falls, Canada.

Capt. Samuel Alsop, Jr.

Capt. Samuel Alsop, Jr., recently released from the U. S. Army after thirty-four months overseas, has been appointed sales engineer for the *Alsop Engineering Corp.*, Milldale, Conn. Capt. Alsop attended New York Electrical School and previous to entering the service was employed by Stearnes & Bond of New York.

The firm also announces the appointment of *Robert J. Landon* to the position of advertising manager. Mr. Landon was released from the U. S. Maritime Service after having served for thirty-four months. Prior to entering the service he was associated with the *Chase Brass & Copper Co.*, Waterbury, Conn.

Mr. C. C. Martin, vice-president of *Rheem Research Products, Inc.*, Baltimore, Md., has announced the appointment of *Mr. H. Irvin* as manager of the Eastern Division of the company effective January 15, 1945. Mr. Irvin's headquarters will be in Baltimore.

Mr. John Neerhout will continue as manager of the Western Division with headquarters in Los Angeles, Calif. The work of the two divisions will be coordinated through Mr. Martin.

Mr. Irvin joined Rheem Research in February, 1944, as Plant Manager and in April of last year was appointed manager of the Marketing Division. Previous to joining the company, he was associated with the *Bendix Radio Corp.* at Towson, Md., as a management engineer of the staff of the general manager. Before that, Mr. Irvin was a development engineer with the *American Brush Shoe Co.;* operating from that concern's Baltimore, New Jersey, New York and Detroit offices.

A number of changes in the staff and field forces of the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J., have been

...ced. These changes include the re-...eral of their staff from the armed ...forces and also the addition of new people.

John A. Bauer has been appointed sales ...er of the company. Mr. Bauer has been with the company almost twenty years, coming from *A. P. Munning and Co.*, which he first joined in 1926 as advertising manager. He took the same post with H-VW-M ...7 after the merger of A. P. Munning ...o. and the Hanson and Van Winkle ... 1933 Mr. Bauer took charge of the ...urgh office; from 1934 to 1936 he ...ed the Philadelphia office, and from ...o 1939 he was in charge of the New

John A. Bauer

York Office. In 1939 he was appointed assistant sales manager with headquarters in Matawan. His responsibilities as sales manager will be the handling of general administrative problems.

Ralph R. Granquist

Ralph R. Granquist has been appointed ...ger of the Chicago office of the company. Following his graduation from college Mr. Granquist engaged in other fields for a time and entered the employ of Hanson and Van Winkle Co. in 1923. He has been a field representative, located in the Chicago office since that time, and is widely known in this territory.

Harold R. Smallman, who also maintains his headquarters in the Chicago office, remains as Western Manager.

Pen-Kote 500

CHEMICAL-RESISTANT MAINTENANCE PAINT

COVERS *Heated* SURFACES AS READILY AS COLD!

HOT tanks, ductwork and similar surfaces can be painted "as is" with Pen-Kote 500, *without shutdown for cooling!* Where other paints would blister and stiffen on contact with such heated surfaces, this *entirely different* protective coating goes on smoothly and easily with perfect adhesion.

In addition, WET surfaces are painted as readily as dry; and porous surfaces require no primer. Pen-Kote 500 *sets in 30 min. or less* to a hard but flexible film of plastic; and *two coats are sufficient* under the most adverse conditions.

Thus complete protection is obtained much more quickly than with other maintenance paints, at ½ the labor cost or less, and with little or no interference to plant operation.

Pen-Kote 500 is *extremely resistant* to acids, alkalis, water, alcohol, gasoline, oil, and many solvents. It is *odorless* and *non-inflammable*. It gives excellent coverage, and is a perfect sealer—assures a durable, good-looking job. Wide range of colors available. Write today for full information.

Equally outstanding in their own fields are Pen-Kote Masking Lacquers—Pen-Kote Rack Lacquers—Pen-Tape—Pen-Tube—and Pen-Blu. May we send you descriptive literature?

Pen-Kote PRODUCTS

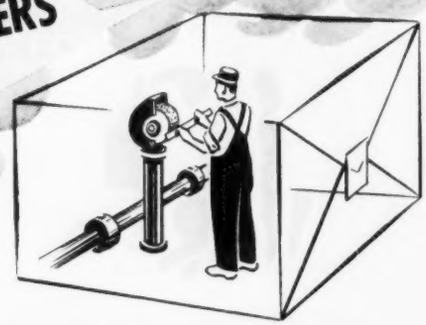
PENINSULAR CHEMICAL PRODUCTS CO.
6795 EAST NINE MILE ROAD
VAN DYKE • MICHIGAN

William J. Wise

William J. Wise, formerly a field representative of the company and more recently a lieutenant in the U. S. Navy, has rejoined the company. Mr. Wise is a graduate of the University of Dayton in Chemical Engineering. He spent nine years with the *National Cash Register Co.* and joined H-VW-M in 1940. in 1942 he entered the service of Uncle Sam in the Navy, became Aviation Ordnance Officer on the carrier "Bataan" and later Ordnance Officer of CASU 22. Mr. Wise will make his headquarters in Dayton, Ohio.

HUMIDITY PROBLEM

for POLISHERS



AT LAST! You Can Keep Production in High Gear Regardless of the Weather with GRIPMASTER

PAT. PEND.
POLISHING WHEEL CEMENT

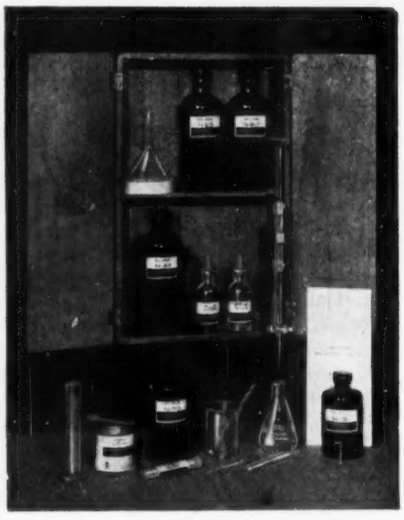
NOW! A new technical advance by Gripmaster *locks in* the emery . . . *locks out* humidity . . . gives you amazing new "vise-tight" adhesive action in *every kind of weather!* Gripmaster now contains a special new ingredient that *fortifies* this better cement against moisture in the air. Discover this important new benefit for yourself. Send for generous free sample today!

GRIPMASTER DIVISION
Michigan Bleach & Chemical Co.
12345 Schaefer Highway
Detroit 27, Michigan

IN CANADA:
Nelson Chemical Co.
Windsor, Ontario

Please send us a generous free sample of Gripmaster, fortified against humidity.

COMPANY_____
ATTENTION_____
ADDRESS_____
CITY_____ STATE_____



CHROMIUM
NICKEL
COPPER

Simple test sets for controlling these and other solutions available.

Write for Literature

KOCOUR CO.

4720 S. CHRISTIANA AVE.
CHICAGO 32

Specify Kocour Sets from your supplier.

Edward M. Close has been appoin sistant purchasing agent, working *Robert A. Malkmus*, head of that ment. Mr. Close was graduated from University in 1937 with a degree of Bac of Science in Business Administration was engaged in hardware industry

Edward M. Close

1941, following which he served in the department of Hanson-Van Winkle-Mu Co., Matawan, until November, 1942, that date until October, 1945, he serv supervisor of priorities.

Walter J. Jurman, who was with the pany for a number of years before the and who left to join the Navy, has re been discharged as Ensign in Naval tion and has rejoined the company. Jurman attended Rutgers University, w he specialized in Business Administra From 1935 until 1942 he was employ the sales and advertising depts. in

Walter J. Jurman

wan. In February 1942 he enlisted in U. S. Navy and served overseas in submarine work and, later, flight sc

He has been assigned to the Chicago office, where he will be in charge of the Order Department.

Hugh Vincent McGuire

Hugh Vincent McGuire was in the employ of the company in 1940, engaged in cost work in connection with the electrical manufacturing department. In the fall of 1941 he enlisted in the U. S. Navy and at the time of his discharge in October 1945 he held the rank of Ensign in Naval Aviation. He is currently assigned to the sales engineering department at Matawan.

Robert A. Noland

Robert A. Noland has joined the company as a field representative. Mr. Noland attended the Lewis Institute of Technology, where he received the degree of Bachelor of Science in Mechanical Engineering and also received specialized training in metallurgy and chemistry. Prior to going with H-VW-M, he was engaged as assistant metallurgist at *Buick Motor Division, G.M.C.*, Melrose Park, Ill. He has been assigned as field engineer located at the Chicago office.

UNICHROME*

AIR-DRY RACK COATING 203

Stands Up Without Splitting or Chipping

Build up the required rack coating thickness with simple dipping and convenient air drying—both at room temperature. And the result is a tough, resilient insulation, well able to take the hard knocks of normal shop handling and repeated racking and unracking of work.

Specially formulated from improved resins, it resists to an outstanding degree the solutions and baths in the plating room. With Unichrome Rack Coating protection, in many shops 500 to 1000 cycles has become the common service life of racks. Write for free trial offer and learn first hand what a difference this rack coating can make in your shop . . . in economy, convenience and trouble-free service. *Reg. U. S. Pat. Off.

PROPERTIES

Chemical Resistance—Excellent for all plating cycles.

Toughness—Withstands repeated flexing and shop handling—cuts cleanly and easily at contacts.

Drying—Dipped in container in which it is shipped and dried at room temperature.

Adhesion—Excellent.

UNITED CHROMIUM, INCORPORATED
51 East 42nd Street, New York 17, N. Y.
Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio

TRY THESE OTHER UNICHROME MATERIALS

Unichrome Coating 202—which is force dried for the extra adhesion required in anodizing and hot, highly alkaline solutions.

Unichrome Quick Dry Stop-Off 322—for cyanide copper and other plating work requiring extreme adhesion.

Unichrome Quick Dry Stop-Off 323—for chromium and other work requiring a stop-off that can be peeled off.

Unichrome Quick Dry Stop-Off 324—for high temperature solutions. It also resists vapor degreasers for a limited time.

Appointment of *Joseph A. Neubauer* to the position of technical adviser to the *Columbia Chemical Division* of the *Pittsburgh Plate Glass Co.* was announced recently by *E. T. Asplundh*, vice president in charge of the division. He will be located in the general office Pittsburgh, Pa.

Mr. Neubauer recently returned from a three-months mission to Germany where he represented the government's Technical and Industrial Intelligence Committee, a function of the Foreign Economic Administration.

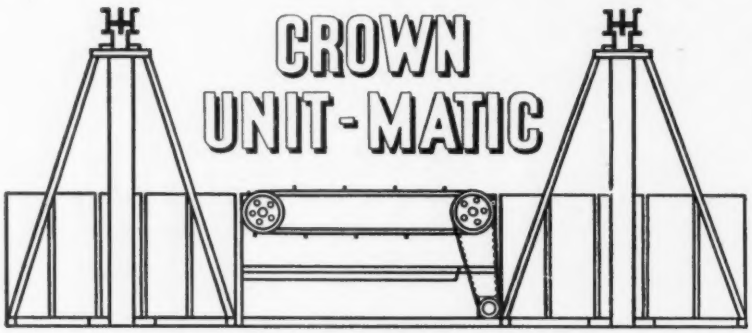
Prior to his trip to Germany, he was superintendent of the huge chlorine producing works at Natrium, W. Va. The Natrium works, near New Martinsville, is owned by the Defense Plant Corporation and operated by the Columbia Chemical Division. Completed in August, 1943, it is the largest chlorine manufacturing plant ever built as a single unit east of the Mississippi River. In addition to liquid chlorine, the plant also produces caustic soda as a co-product.

A native of Cleveland, Ohio, Mr. Neubauer is a graduate of the Case School of Applied Science. Associated with the Columbia Chemical Division since 1933, he first worked in the soda ash and chlorine departments and later was assistant to the production manager at the Barberton, Ohio, plant.

Announced also was the appointment of *Earl Wolf* as superintendent of the Natrium plant. Mr. Wolf had served as plant engineer at the West Virginia plant since August, 1943. He has been associated with

Crown

BRINGS TO THE PLATING INDUSTRY THE OUTSTANDING EQUIPMENT DEVELOPMENT DURING THE PAST QUARTER OF A CENTURY



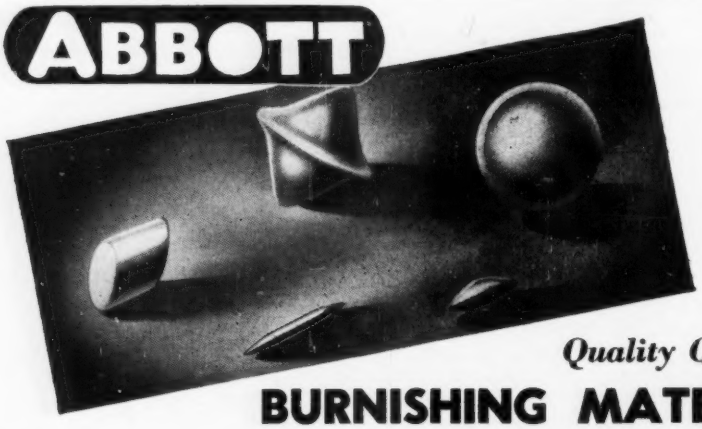
(PATENT APPLIED FOR)

FULLY AUTOMATIC
PARTIALLY AUTOMATIC
EQUIPMENT

FOR
PLATING
ANODIZING
CLEANING
PICKLING

CROWN RHEOSTAT & SUPPLY CO.
3465 N. KIMBALL AVE. CHICAGO, ILL.

ABBOTT



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BURNISHING MATERIALS

Want a sample kit of materials?

There's more than seen on the surface—Abbott Burnishing Materials . . . Balls, Pins, Slugs, Cones . . . are given the proper heat treatment to provide the all important "backbone" necessary for an efficient job of Burnishing . . . Abbott Materials are quality controlled! Lower your finishing costs—use Abbott Materials!

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the Columbia Chemical Division at its Barberton plant since January, 1934, successively holding the positions of junior engineer in the power department, assistant to the plant engineer, and maintenance engineer. A graduate of Ohio State University, class of 1932, he holds the degree of Mechanical Engineer. Mr. Wolf is a native of Loudenville, Ohio.

L. A. Davies

L. A. Davies, who owns and operates the *Davies Supply and Mfg. Co.* of 4 North 9th St., St. Louis, Mo., has been appointed by the *Udylite Corp.* of Detroit (Plating Processes, Equipment and Supplies), as distributor for Missouri, Arkansas, Oklahoma, Kansas, Texas, and Louisiana.

Mr. Davies is no stranger in the Udylite organization. After graduation from Purdue with a batchelor's degree in Chemical Engineering, he joined the research staff of the *Formica Insulation Co.*, Cincinnati, and then in 1927 went to the Pacific Coast to represent the Udylite Corp.

In 1931, Udylite transferred Mr. Davies to Chicago as district manager. He remained in that position until he went into the Navy in 1942.

In the service he acted as resident inspector of naval material at Coffeyville, Kan., Omaha, Neb., and Penn Yan, N. Y. Later as a lieutenant commander, he supervised all the resident inspectors in the Chicago district.

When he was discharged from the service he established the present business in St. Louis.

W. S. Mounce, formerly senior metallurgist with the Hamilton Standard Propellers Division, United Aircraft Corp., in East Hartford, Conn., has joined the Development and Research Division of *The International Nickel Co., Inc.*

He will make his headquarters at the New England Technical Section of the Division at 75 Pearl St., Hartford, Conn., of which *D. A. Nemser* is manager.

Mr. Mounce graduated from Tufts College in 1939, where he received a B. S. degree in chemistry. He attended the Massachusetts Institute of Technology from 1939 to 194[illegible]

as a special student in the Metallurgical Department.

Mid-City Processing Corp. announces the election of *Edward B. Sills* as president and general manager in charge of all finishing operations. Mr. Sills was formerly vice-president of *Master Industries, Inc.* where he was in charge of all metal finishing operations.

Also associated with Mr. Sills in his new venture are the following men all widely experienced in the finishing field:

John Gibson—maintenance and development of special equipment.

Russell Jacoby—in charge of all electroplating operations.

Sam Cardella—in charge of all spray painting operations.

Peck Mellow—in charge of time study and cost analysis.

Mid-City Processing Corp. has moved to its new and enlarged quarters at 1430 Roosevelt Rd. and is now in full operation with all new and modern finishing equipment.

Manufacturers' Literature

Safety Equipment

The new, complete 178-page 6-B Catalog has just been published by *Mine Safety Appliances Co.*, describing and illustrating the complete range of M.S.A. safety equipment for industrial application, including many new products.

A 6-page introductory section illustrates and describes the complete research laboratories and plant facilities of Mine Safety Appliances Co., the world's largest commercial manufacturer of approved safety equipment.

The regular edition of the 6-B Catalog is in its usual 8½" x 11" size. Also available is a new, handy, pocketsize edition of this catalog 5" x 6½", containing the same material and number of pages as the large edition, but in the miniature size.

Copies may be secured by writing to Mine Safety Appliances Co., Dept. MF, Pittsburgh 8, Pa.

Bright Nickel Plating

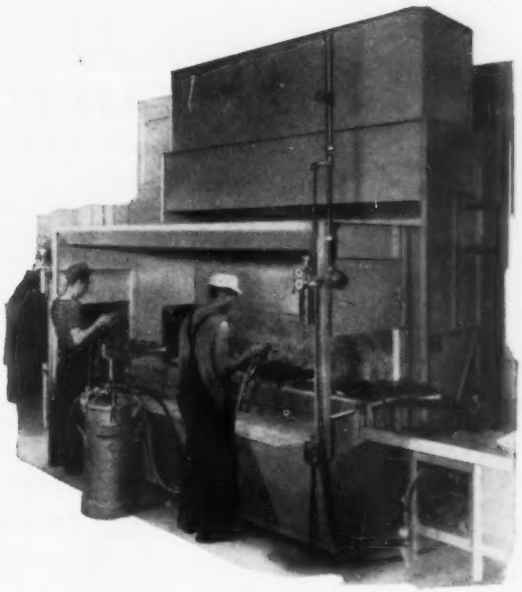
The *Hanson-Van Winkle-Munning Co.*, Matawan, N. J., has issued a set of instructions for operating the cobalt-nickel plating processes developed by that company. These processes include Type 9H, Type 5, and Type AA.

The instructions cover descriptions of the processes; preparation of solutions; methods of compounding and purification; conversion of existing solutions to the cobalt-nickel processes; operation and control; also the Jernstedt Electroplating Computer.

Use of Fire Extinguishers

A new series of concise, comprehensive instruction cards, explaining the operation and maintenance of four of the most widely used types of hand fire extinguishers, has been prepared by *American-LaFrance-Foamite Corp.* Dept. MF, Elmira, N. Y. They cover the Foam, Soda-Acid, Vaporizing

TRIAD *PR* Cuts Spray Booth Clean-Up Time



White, non-glare coating of Triad PR improves visibility in the booth.

Clean-up time is reduced from hours to minutes when Triad PR is used on the sidewalls of wet or dry paint spray booths. Readily applied with a brush or spray gun, PR is quickly removed by water or steam along with all accumulated surface deposits.

Detrex field representatives can also supply scientifically compounded water conditioners to fit your individual wet spray booth set-up. Case histories, compiled by our representatives, have shown that PR and associated Triad spray booth compounds have cut "down-time" and maintenance costs in every installation in which they have been used.

DETREX CORPORATION
Detroit 27, Michigan

ALKALI CASE HISTORY

10. REMARKS: In removing Triad PR, two maintenance men spent 20 minutes cleaning a 125-foot canopy and two large spray booths and, in addition, prepared another batch of PR for respraying the cleaned areas. Formerly, when the company's own compound was used, it required one hour for five men to clean the canopy alone.

DETREX Corporation
DETROIT 27 • MICHIGAN
Solvent Degreasers • Metal Parts Washers • Processing Equipment • Industrial Cleaning Chemicals

CLEAN-RITE
All-Purpose CLEANERS

ANODES
BLACK OXIDE SALTS
BUFFS
CHEMICALS
CLEANERS
COMPOSITIONS
ELECTROPLATING EQUIPMENT
LACQUERS
PLATING RACKS
POLISHING EQUIPMENT
POLISHING WHEELS
SOLDER FLUX
STOP OFF MATERIALS
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COMPOUNDS: Burring, Cutting Down, Polishing, Mirror Finishing.
4A CEMENT: Used for setting up Wheels, Belts, Buffs & etc.

HARRISON & COMPANY, INC., Haverhill, Massachusetts

Liquid, and Carbon Dioxide types. [illegible] illustrations accompany the text and [illegible] the various steps to be taken in hand[illegible] operating, and maintaining the extinguish[illegible]

Because fires are not all alike, it has [illegible] necessary to produce different types of [illegible] tinguishers to meet such differing condit[illegible] The use of the wrong kind of fire extingu[illegible] er may be worse than none at all.

These cards, mounted adjacent to [illegible] extinguishers they illustrate, will provi[illegible] constant and accurate guide to plant [illegible] ployees. Upon request, a reasonable num[illegible] of the cards will be available to indu[illegible] in general, without obligation, of cours[illegible]

Electrical Indicating Instruments

Marion Electrical Instrument Co., Dept. [illegible] Manchester, N. H., announce that their [illegible] comprehensive catalogue is now availa[illegible]

This 28-page book illustrates and descr[illegible] the Marion line of standard and hermeti[illegible] sealed electrical indicating instruments, [illegible] cluding the very latest and up-to-date [illegible] velopments in the instrument field.

An interesting section of this catal[illegible] is intended as a guide to prospective p[illegible] chasers of electrical indicating instrume[illegible] This section incorporates detailed explan[illegible] tions of the factors involved in the use [illegible] instruments in general, and points out [illegible] specific indications for certain instrume[illegible] thus assuring the buyer that he will ob[illegible] the right instrument for his equipment.

The catalogue further shows the devel[illegible] ment of instruments at Marion, various p[illegible] duction procedures and the rigid tests [illegible] which the instruments are subjected dur[illegible] manufacture to insure the highest possi[illegible] efficiency and satisfaction during use.

The catalogue will be sent, free of char[illegible] upon request to the company at the abo[illegible] address.

Air Separator

Bulletin S-13, 4 pages, describes the A[illegible] fuge, combination air separator and trap [illegible] users of compressed air tools and oper[illegible] tions. Discusses need for clean dry air [illegible] the protection of pneumatic equipment. F[illegible] *Swartwout Co.*, Dept. MF, 18511 Euclid Av[illegible] Cleveland 12, Ohio.

Marking Equipment

A new catalog, describing a compl[illegible] line of marking equipment, is announc[illegible] by the *Acme Marking Equipment C[illegible]* Illustrated throughout, it includes mo[illegible] than 150 different products in the marki[illegible] field, among them Acme's branded line [illegible] "Ram's Head" steel stamps.

One feature of this new catalog is it[illegible] thumb index in the front and back of th[illegible] book. By placing a thumb opposite th[illegible] listing in the index, the reader is guid[illegible] to the proper portion of the book by [illegible] prints on each page. A carefully-planne[illegible] classified arrangement makes for quic[illegible] reference to the materials desired.

Copies may be secured without charg[illegible] or obligation by writing the Acme Marki[illegible] Equipment Co., Dept. MF, 2222 West Fo[illegible] St., Detroit 16, Mich.

Mounted Wheels and Points

As a companion piece to its highly successful booklet on Cool-Cut Wheels, *Robertson Manufacturing Company*, Dept. MF, Trenton 5, N. J., have published a comprehensive booklet on their "Cyclone" mounted wheels and points. In addition to presenting the facts about the company back of the product and the features of "Cyclone" points and demountable wheels, the booklet includes complete information on critical speeds, operating rules, and standard shapes and sizes. A special feature of the booklet is a detachable form which can be used to send information and sketches to Robertson with a request for a recommendation as to what wheel to use for a particular problem.

Multi-Wash Equipment

Just off the press is *Bulletin No.* 310 on Schneible Multi-Wash equipment for the control of dust fumes and odors.

This bulletin presents the advantages of the wet method, originated by Schneible, including low operating and maintenance costs of the equipment employed, as well as the thorough removal of dust, fumes and odors from the collected air.

It contains illustrations and descriptions of the various Schneible units: Multi-Wash dust collectors, settling and dewatering equipment of various types, Schneible "Wear-proof" sludge pumps, entrainment separators, and a portable, self-contained dust and fume collection system embodied in one compact unit. Bulletins giving complete information on these various equipments are offered.

Many installations are shown in Bulletin 310. An interesting page contains the names of users of Schneible Multi-Wash equipment, who each have more than 50,000 c.f.m. capacity installed. If a list of the leading establishments in the industries where dust and fumes are most prevalent were compiled, it would closely duplicate this list.

Bulletin No. 310 will be mailed upon request by *Claude B. Schneible Co.*, Dept. MF, 2827 Twenty-fifth St., Detroit 16, Mich.

Associations and Societies

American Electroplaters' Society
New York Branch

The *New York Branch* of the *A. E. S.* will hold a *Technical Session* and *"Victory Celebration" Banquet*, Saturday, February 3, 1946, at the Hotel Pennsylvania, 7th Ave. and 33rd St., New York City.

The Technical Session will be held in the Keystone Room of the Hotel Pennsylvania at 3 p. m. The program is as follows:

Practical Brass Plating—by *William J. Schneider*, E. I. DuPont de Nemours Co.

New Developments in Silver Plating—by *Philip Lo Presti*, Sylvania Electronics Corp.

Polishing and Grinding of Metals—by *Howard McAleer*, Formax Mfg. Co.

The banquet will be held in the Manhattan Room of the Hotel Pennsylvania at 7:30

GE chooses Luster-on

Engineers at General Electric looked over the field and chose Luster-on* for the protective bright dip for zinc plated parts on their new 1946 radios. Read their statement — it tells the whole story of Luster-on superiority. Then send the coupon and a sample part for proof that you can see with your own eyes.

Here's What G-E Says . . .

We are using Luster-on on the chassis, speaker shells and other parts of our current radio line. Over and above the pleasing brilliancy of the finish, we find that with Luster-on we experience no difficulty in spot welding directly on finished surfaces, thus speeding production; and Luster-on affords protection from corrosion and salts formation to the parts treated, thereby promoting a greater expectancy of continued good service from our radios.

Paul L. Chamberlain
Manager of Sales
RECEIVER DIVISION

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*Patent applied for

THE Chemical CORPORATION
54 Waltham Ave., Springfield 9, Mass.

THE CHEMICAL CORPORATION
54 Waltham Ave., Springfield 9, Mass.

Please send me full particulars about Luster-on* bright dip for zinc surfaces. I am (am not) sending sample part for free dip. No obligation, of course.

Name.....

Address.....

Metal Finishing, February

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For

American Electroplaters' Society

NATIONAL CONVENTION

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Make Transportation and Room Reservations as soon as possible!

Convention News and listing of Educational Sessions to be announced later.

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by JOSEPH NOVITSKY

- We specialize in plating racks of our own patent.
- Constructed without screws, rivets, solder, brazing, welding.
- We design racks to suit your individual problem.

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Factory: 147-24 Liberty Ave., Jamaica 4, L. I., N. Y.
(Phone—REpublic 9-7223)

p. m. and will be followed by entertainm and dancing.

Subscriptions for the banquet are avail at $7.50 per person.

Franklin J. MacStoker, General Chair 25 Princeton St., Garden City, N. Y.

Boston Branch

The Eleventh Annual Technical Ses and Banquet of the *Boston Branch* of *American Electroplaters' Society* will be h in the main ballroom of the Hotel St on Saturday, March 9, 1946. This, our post-war affair, should prove to be unusu enjoyable socially; and, from a techn standpoint, especially valuable to all o in our reconversion problems.

Leonard Chesworth, Chairman of the E cational Committee, has lined up an ex tionally fine technical session, which include the following speakers and ubjects:

L. C. Conradi. "Corronizing"

Walter Pinner, "High Chloride Nickel P ing"

William C. Phillips, Subject to be announ

This session will get under way at 1 P.M. with *Dr. Walter Meyer* presiding. are looking forward to some interesting cussions.

Mrs. Ann Baker Love, who has done a marvelous job in previous years, has ranged a program for the ladies which provide a most enjoyable and entertain afternoon.

The evening's program includes the b quet, presentation of prizes, a gala floor-sh and dancing until midnight.

The tickets, $5.00 each, include tax gratuities to waiters.

Louis Gagnon, Chairman.

Los Angeles Branch

R. M. Bauer, gas supply supervisor, *Sou ern California Gas Co.*, and *J. F. Brossa* president, *Industrial Filter & Pump Mfg. C* Chicago, divided honors on the speake program of the educational session of t January 14 meeting of *Los Angeles Branc A. E. S.*, at the Cabrillo Hotel.

Mr. Bauer set shop owners, manufacturi plant operators and supply company repr sentatives straight on why their industri gas supply is shut off at certain times the year.

The speaker presented a talk on the natur gas industry of California. He explained t history and development of natural gas, t amount of the supplies which are availabl to Southern California gas utilities, and t curves in demand which periodically requi shutting off supplies to industrial users order that domestic consumers can be accom modated.

Mr. Brossart's appearance as a speak was impromptu, he having taken advanta of his presence in Los Angeles on a busine trip to attend the A. E. S. session and renew old acquaintances. He presented a brief d cussion of modern plating solution filtrati from data which he explained had be largely compiled by *R. Scott Modjeska* of t *Scientific Control Laboratories*, Chicago.

Chapter President *E. W. Wells* presid during the business session. Applicatio

for membership were received from the following:

William Fricke, Bauers Mfg. Co.; *Carl Thein*, Electro-Plastic Process Co.; *J. R. Drake*, Kennard & Drake Analytical Laboratory, and *R. L. Kass*, Russill Plating Co.

A letter was read from *Laurence C. Smith*, secretary, Sydney, Australia, Branch, A. E. S., requesting Los Angeles Branch to serve as Sydney's proxy in Supreme convention matters. In view of the fact that Los Angeles will probably not send a delegate to the convention this year and has already assigned its proxy to Chicago Branch, it was decided to accept the Sydney proxyship contingent upon whether the Supreme secretary rules Los Angeles eligible to do so under the circumstances.

Secretary *Frank Bunker* was instructed to have a photostatic copy made of the Sydney letter and to forward the photostat to the Supreme secretary.

Marcus Rynkofs reported that negotiations for the establishment of a night-school class in chemistry in its application to metal deposition had been concluded successfully. Classes, he reported, started at Poly-Technic High School on January 8. The permanent schedule calls for two classes a week, Mondays and Wednesdays, from 6:30 to 9 p. m.

Exposition of Chemical Industries

The *Twentieth Exposition of Chemical Industries* will be held in the Grand Central Palace, New York City, February 25th to March 2nd.

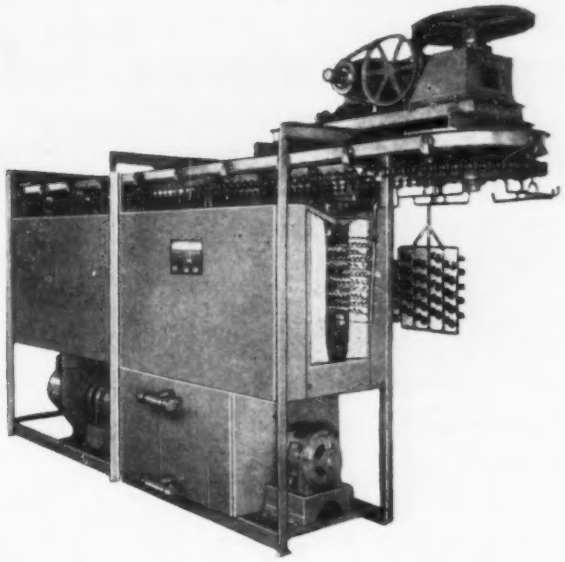
The Exposition opens Monday, February 25th, at 2 p. m.; open daily thereafter, 11 a. m. to 10 p. m., except Saturday, March 2nd, when the Exposition terminates at 6 p. m.

News from California
By FRED A. HERR

Charles A. Russill, who operated the *Russill Plating Co.* at 1407 Esperanza St., Los Angeles, for many years before he sold out about a year ago, has established himself as a manufacturer of rheostats and miniature burnishing and plating barrels at 1344 West Slauson Ave., in the plant formerly occupied by *Bedwell Plating Co.*

While he is confining himself to the production of rheostats until materials become available for other items, Mr. Russill expects later to manufacture midget burnishing and plating barrels, designed to accommodate the small lots of screws, bolts, nuts and other items that job-shop platers sometimes are called upon to handle and which, according to Mr. Russill, can be more effectively and conveniently worked in barrel units of small size.

Average size of the barrels he intends to produce will be 5 inches in diameter, 10 inches in length. Mr. Russill completed one barrel recently for the government which was almost of watch-charm size. It measured 5 inches in length, 2½ inches in diameter, and was designed to meet the special needs of the California Institute of Technology, Pasadena, in working on delicate precision instrument parts.



METALWASH Spotless Dryer
for Plated or Lacquered Parts

- Eliminates the necessity of hand-wiping or buffing to remove water spots.
- Can be furnished as self-contained unit, to suit existing conveyor or automatic plating machine.

Metalwash Machinery Co.
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Washing, Pickling and Drying Equipment

NICKEL SULPHATE

Exceptional Purity

LOTTE CHEMICAL CO. INC.
Manufacturers
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LaMOTTE CONTROL EQUIPMENT
for the
ELECTROPLATER and ELECTROTYPER

As an aid in the control of plating baths of
NICKEL, ACID ZINC, TIN, CYANIDE
ACID COPPER, CADMIUM, BRASS and BRONZE

LaMotte Block Comparators

for pH tests to accurately control the acidity and alkalinity of nickel, zinc, tin or cyanide baths. Inexpensive and easy to operate. A test can be made in a few minutes.

LaMotte Acid-Copper Analytical Set

for accurately determining and regulating the acid and copper content of the bath to insure uniform results.

Other LaMotte Outfits for determining Chlorides, Nickel Content, Iron Content and positive control of Cyanide Copper, Acid Zinc, Cyanide Zinc, Cadmium, Brass and Bronze plating solutions.

Write for further information.

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Originators of the Practical Application of pH Control
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A PRECIOUS METAL COMPLEX SALT FOR THE PLATING TRADE

Renders Electro-Silver Plate Harder, Longer Lasting —Tarnish Resistant.

Easy to use—No Extra Work.

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GRANIUM "A" for Platinum & Gold
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Lasalco's ***HI-SPEED***
BUFFING COMPOUND

Try it! Ask today for a liberal sample of HSC Buffing Compound.

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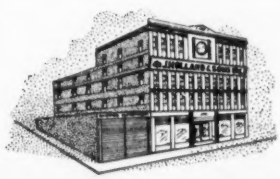

J. HOLLAND & SONS, Inc.
Electroplating and Finishing Equipment and Supplies

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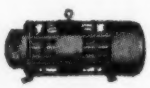

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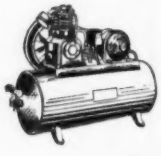
All Sizes and Types
Rheostats 50-1500 amperes with or without meters.

V-DRIVE POLISHING LATHES
Sizes 3-15 horsepower. Complete unit is ball-bearing, totally enclosed, Sturdy construction.



SPRAY PAINTING EQUIPMENT
Spray guns, Air compressors, Spray booths and complete paint finishing units. Baking ovens.

•

J. HOLLAND & SONS, Inc.
276 South Ninth Street Brooklyn 11, N. Y.
AT BROADWAY

Baby Darling Products has moved from 317 South Hill St., Los Angeles, to enlarged factory and office quarters on Towne Ave., near Seventh St. The firm specializes in bronzing infants' and children's shoes by the spray metal process and mounting them on metal bases for use as ash trays, bookends and knick-knack holders. The company plans to install a plating tank in its new plant for use in electroplating shoes and bases and expects to expand later into the wider field of bronze plating metal art objects in general. *John Keas* is senior partner, *Roy Kude* junior partner and shop foreman, and *Robert S. Burrill* is sales manager.

In advance of its contemplated move to larger quarters in South Gate, Calif., the *Plastic Coating Co.*, 3421 East 26th St., Los Angeles, has changed its name to *Barber-Wells Co.* The firm manufactures plastic linings for plating and solution tanks.

Evan O. Thomas, founder and head of *Parts Mfg. Co.*, Glendale, Calif., has sold the firm to the *Ellinwood Industries*, which will operate it as one of the several Ellinwood divisions in Southern California. While Mr. Thomas has retired, *Ray Maurer* has been retained by the new owners as plant superintendent and *Collin R. Chambers* as sales and engineering manager.

One of the largest metal finishing departments in Southern California is due to be installed in the proposed new plant of the *Superior Sleeprite Corp.*, which has announced plans for erecting in Los Angeles the largest bed and metal furniture factory west of the Rockies.

The firm has acquired 3½ acres at 6200 Wilmington Blvd. and will construct a plant of 156,000 sq. ft. on the main floor and 40,000 sq. ft. for offices and showrooms on the second floor. Occupancy is expected by April for the production of beds, springs, juvenile furniture, dinettes and metal bedroom suites. The cost is estimated at $1,000,000.

Poulsen & Nardon, Inc., Los Angeles, has purchased *Monarch Tool & Instrument Co.* of San Diego and plans to use the plant for the manufacture of aluminum kitchenware under the name of Monarch Division.

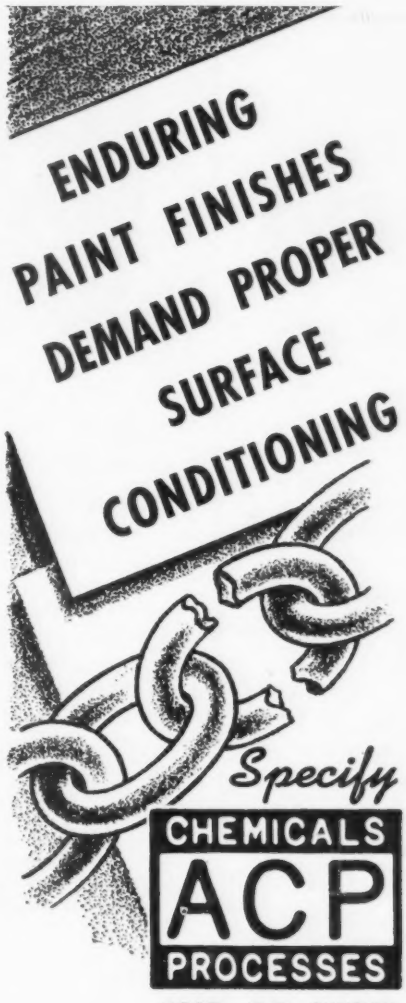
Anthony M. Cioffi and *John Strutzel*, formerly with *Poulsen & Nardon*, recently took over, by purchase, the *Aircraft Stamping Co.* of Alhambra, Calif., and will operate it as a partnership for the manufacture and finishing of bridle bits and other equestrian equipment, and metal toys.

Reconversion in Southern California

Lights, Inc., Alhambra, is installing considerable heavy-duty equipment to begin manufacture of cigarette lighters and household electric appliances.

Price-Pfister Mfg. Co., Los Angeles, has added 3,000 sq. ft. of floor space for resumption of the manufacture of plumbers' brass goods which work was suspended during the war.

The Lynwood, Calif., plant of *Los Angeles Manufacturers* has begun production of 1¢ and 5¢ peanut vending machines.



ACP has developed metal cleaning, rust removing and metal conditioning Chemicals and Processes which assure enduring finishes.

Our Technical Department will gladly assist in adapting them to your manufacturing needs. Write to Dept. C-1.

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Metropolitan New York Area: Bricker & Andes, 318 Atlantic Ave., Brooklyn, N. Y.
Eastern Ontario and Quebec: Van Camp Products & Sales Co., 177 Parliament St., Toronto, Ont.

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insure High Efficiency . . faster Action . . greater Economy in Metal Cleaning Operations

PERMAG Compounds give pre-eminent satisfaction in the preparation of metal surfaces prior to finishing.

Fewer rejects—increased production and uniform high quality finish are standards PERMAG has helped electroplating shops to establish.

Our Cooperative Technical Service has aided in the solution of hard cleaning problems in scores of plants.

Write us for details. No obligation for interviews.

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Use

McKeon's

"Liquid Sulphur"

TRADE MARK REG'D

• for producing black oxidized finishes on copper and silver. Is simple and easy to use:—fool-proof in operation. Does not deteriorate in stock. Gives chemical control of oxidizing solution.

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Arrocap Industries, operated at 2400 W. Florence Ave., Los Angeles, by *J. N. Monahan*, has converted to the point of beginning manufacture of lingerie dryers.

U. S. Aluminum & Mfg. Co., Huntington Park, has resumed making kitchenware, Dutch ovens, deep fat fryers and floor furnace grilles and burners.

Aero Novelty Co., 1811 S. Hope St., Los Angeles, has begun the production of airplane ashtrays.

Virtue Bros. Mfg. Co., now at 1650 Long Beach Blvd., Los Angeles, is constructing a new plant at 5701 W. Century Blvd., for the manufacture of chrome household furniture and equipment.

Personal Items

Floyd E. Keeble, 34, polisher in the metal finishing department of the *United States Spring & Bumper Co.*, Los Angeles, died January 14 from injuries received when he was crushed beneath a polishing machine.

Ernest Lamoureux, member of Los Angeles *A. E. S. Branch* and honorary life member of the *Supreme Society*, was seriously ill with a heart ailment early in January. He was confined to his home under the care of a nurse for more than a week. In mid-January he was reported to have passed the crisis and was on the road to recovery.

Fred Maurer, process engineer of the *General Electric Co.*, Ontario, Calif., was confined to the hospital in January suffering from a brain tumor.

John F. Brossart, president, *Industrial Filter & Pump Mfg. Co.*, Chicago, was in Los Angeles on a combination business and pleasure trip during the first week in January.

Harold J. Kroesche, formerly with *Harshaw Chemical Co.* and the *A. J. Lynch Co.*, at Los Angeles, is now affiliated with *Western Plastic Co.*, Glendale, Calif.

Seaman 1st Class *Stanley Rynkofs*, son of *Marcus Rynkofs* of the *Liberty Plating Co.*, Hollywood, was discharged from the Navy December 24 after 1½ years overseas service. He spent a three weeks vacation at Grass Valley, Calif., before resuming his former post as shop superintendent of the Liberty Plating Co.

An announcement has been received of the marriage at Riverside, Calif., on December 27 of *James P. ApRoberts* and *Miss Alydia Ruth Dutcher*, daughter of *Mr. and Mrs. James A. Dutcher* of Riverside. Mr. ApRoberts was formerly employed in the process engineering and research department of *Lockheed Aircraft Co.*, Burbank, Calif., and in the laboratory of *Turco Products, Inc.*, Los Angeles.

PRACTICAL CONDUCTIVITY MEASUREMENTS

(*Concluded from page 62*)

These data show that errors of + or − 50% may be obtained for this type of study, which are not objectionable when the simplicity of the measurements, the effect of rate of flow on the limiting concentration

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and the irregularity of manual operation are considered.

Conclusions

These conductivity studies illustrate that conductivity is a rapid and reliable method for plant control of certain types of solutions.

The method is used by many operators in the general detergency field, but at present it is not widely used among platers.

This work was intended to illustrate the versatility and practicability of conductivity measurements. The mathematical methods were only developed to illustrate how such measurements give the approximate results expected.

Acknowledgment

The authors wish to acknowledge the aid of mathematician Paul Healy in the development of equation 6.

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3. Perry, Chemical Engineers' Handbook, First Edition, page 263.
4. For a discussion of drag-out, see W. Blum, A. O. Beckman and W. R. Meyer, General Principles and Methods of Electroplating, Trans. Electrochem. Soc., **80**, 258 (1941).

Protective Value of Electro-Tin

(*Concluded from page 67*)

fully dried off, first in clean cold running water and then hot boiling water, and thereafter preferably lightly scoured before being transferred to the zinc or cadmium solutions.

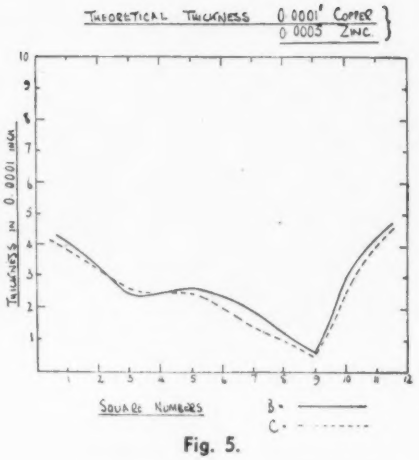

Fig. 5.

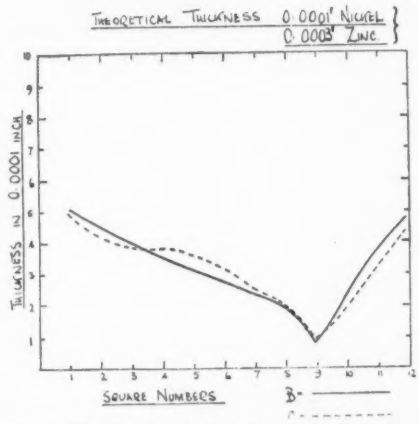

Fig. 6. Distribution of zinc deposit on test piece.

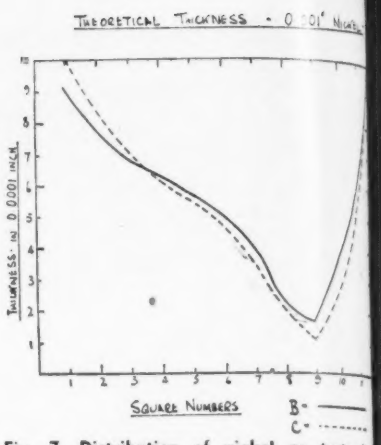

Fig. 7. Distribution of nickel on test pie

There is a considerable field in the va of the process as applied to castings, whi are notoriously difficult to plate. It h been found that the undercoating of tin co siderably eases the subsequent zinc or ca mium plating operation.

To sum up, it is believed that the use a tin undercoating for such finishes as zi cadmium, and to a lesser extent, nickel, likely to be of some importance in the finis ing of ferrous components, particularly tho of complex shape, which are required withstand difficult corroding conditions service.

The author desires to acknowledge t assistance of Mr. E. J. Blewett, under who supervision the thickness determinatio were carried out.

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